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# THE THEORY AND INTERPRETATIONS OF ELECTROCARDIOGRAMS

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INTRODUCTION. It is not our object to present anything new in this paper but we have attempted to put forth some of the fundamental principles concerning the theory and interpretations of electrocardiograms in a concise and yet at the same time in an easily intelligible form, the paper being mainly intended for the general practitioners. We have tried to illustrate the paper in places with electrocardiograms of our private patients and of patients treated in the Carmichael Medical College Hospitals. Whenever there are conflicting views, the view that has appealed to our minds has been put forth. The electrocardiograms of only the more common and important conditions have been discussed. New terminology has been followed. Text books and works on the subject have been freely consulted and acknowledged in proper places.

DEFINITION OF AN ELECTROCARDIOGRAM. Electrocardiogram is the graphic representation of the changes in electrical potential which accompany the heart beat.

THE VALUE OF ELECTROCARDIOGRAPHY. " By means of the electrocardiograph we are able to obtain records of the movements of both the auricles and ventricles, to measure the function of conductivity of the auriculo-ventricular bundle not only above, but also below its division into two branches—that is, after its entrance into the ventricular muscle, and to make out the time-relations of the contraction of the auricles and ventricles.

In addition, it tells us the point of origin and path of conduction of the stimulus for contraction. It is the most precise means at our disposal of investigating the state of the myocardium." (Price, 1929).

In fact, in a difficult or disputed heart case ' Electrocardiography is the last court of appeal and its judgment is practically speaking infallible' (Lewis, 1928).

BRIEF HISTORICAL CONSIDERATION. The current of action was first demonstrated in the heart by Kolliker and Muller in the year 1856. Waller in 1887 first showed that it is possible to register the human heart with the help of a capillary electrometer. Einthoven's string galvanometer was first described in 1903 and this instrument was utilised in the more elaborate apparatus electrocardiograph in registering

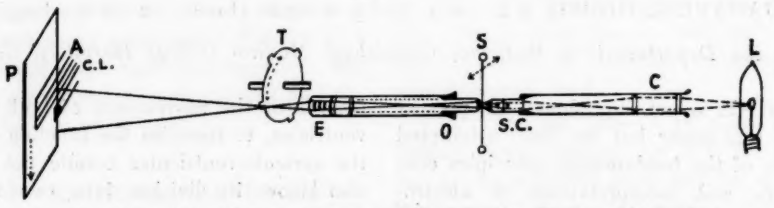
the changes of potential in the contracting human heart in the year 1904. Since then much has been done by various workers in improving the apparatus and also in throwing light upon the interpretations of electrocardiograms. Various instruments are now in use including portable ones. Instruments are now available with cathode ray recording device. The cathode ray tube enables an immediate visual observation of the electrocardiogram to be obtained by the use of a fluorescent screen. The instrument is portable and the advantage lies in the fact that the electrocardiogram can be easily watched for any length of time in any of the leads and a diagnosis can be made at once without necessarily waiting for the photographic record.

THE OPTICAL ARRANGEMENT OF THE ELECTROCARDIOGRAPH. The optical arrangement of an electrocardiograph is schematically represented in Fig. 1.

The light which has to be strong is derived from the lamp. As the light passes through condenser the divergent rays from the lamp are condensed. The rays as they pass through the substage condenser are focussed on to the fibre. The image of the fibre is projected on to the cylindrical lens by the objective and eyepiece which having an arrangement similar to that of a microscope also magnifies the image. While passing from the eyepiece to the cylindrical lens the rays are interrupted where they come to a focus by the spokes of the rotating time marker.

The distance between the spokes and the rate of rotations of the wheel as also the rapidity of movement of the film or plate govern the time marking. Every fifth spoke is thicker than the others. The shadow of the thin spokes is just sufficient to cover the width of the slit. As these pass by the slit and cover it, the light is cut off for an instant so that the film is not exposed to the light and one of the finer vertical lines is produced. The thicker spoke makes the fifth and wider line as it lasts for a longer time. From the cylindrical lens the image is brought upon the moving plate or film through a slit. The direction of movement of the plate is vertical in the direction of the arrow. The direction of movement of the fibre is transverse, so that in the plate or film the movement of the fibre is recorded sideways and when the plate or film is taken out and held horizontally the deflections are seen recorded as upwards and downwards. The cylindrical lens is ruled vertically at millimeter distances and these lines are photographed on the plate and are found as horizontal lines on the illustrations. By the use of a shutter three or more records may be successively taken side by side upon the same plate or film.

FIG. 1.




Sectional view of optical arrangement made use of in Electrocardiography.

L.—Lamp. C.—Condenser. S.C.—Substage condenser. S.—String of the galvanometer. O.—Objective. E.—Eyepiece. T.—Time marker. C.L.—Cylindrical lens. A.—Adjustable slit. P.—Plate or film within the camera.

Modified from the mechanism and graphic registration of the heart—by Thomas Lewis, 1920.

THE STANDARD LEADS. The different modes of connections by which the heart's current is carried through the galvanometer are called the 'leads.' When the connection is directly with the heart that is to say one of the electrodes is inserted directly into the heart as in the animal experiments the lead is called a 'direct' one. But when the current from the heart is carried to the galvanometer from a part which is situated at a distance from the heart the lead is called a 'remote' one.

The three standard leads are described below:—

Lead I. Or the transverse lead—This is a lead from the right and left hands.

Lead II. Or the oblique or axial lead—This is a lead from the right hand and left leg.

Lead III. Or the left lateral lead—This is a lead from the left hand and left leg.

Besides these other leads are now being used specially for the diagnosis of coronary disease. Thus there is now a lead IV as follows:—

Lead IV. Or anteroposterior lead—This is a lead from the precordium to an indifferent place usually back of the chest.

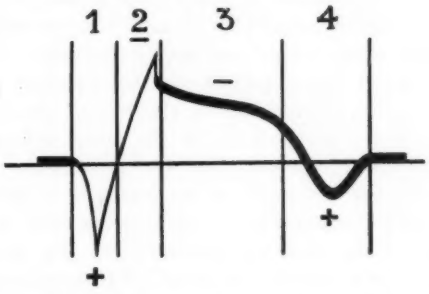
Still more recently Lead IV is being employed with the position of electrodes reversed and this may therefore be called postero-anterior lead.

### The Theory of the Electro-Cardiogram

The Electrophysiology of Muscular Contraction. According to the work of Craib the contracting portion of a muscle fibre develops a series of electrical potentials. At first there is a brief small positive phase, then a brief more marked negative phase, then a more prolonged quite small negative phase and finally a small but somewhat larger positive phase. Owing to the occurrence of this series of changes if a non-polarisable electrode is placed at the contracting part and the other electrode placed at a distance from it and the two are connected to a galvanometer, there will be a series of deflections of the galvanometer needle or string. We know, that the current flows from the 'positive' to the 'negative' through the galvanometer. Due to the initial positive phase if there be a deflection of the needle, let us say, downwards then as the excitation proceeds the part will become later on iso-electric bringing the needle back to the zero level.

Due to the second phase there will then be a deflection of the needle upwards. As both the second and third phases are negative and as the second one is more marked but less lasting than the third one the needle will come down to some extent but will still remain some distance above the zero level and because of the thrid phase will maintain itself at this level for sometime. After this however the needle will come back to the iso-electric level and due to the fourth phase there will be a downward deflection again and finally the needle will come back once more to the original zero level, so that if these deflections are recorded in a graphic form, a curve like that shown in Fig. 2 will be obtained, (Pardee, 1933).

Fig. 2.




The numericals indicate the portions of the curve due to the respective phases.

The Application of the Electrophysiology of Muscular Contraction to the Contracting Heart. The electrical phenomena associated with the contraction of a muscle fibre or a muscle strip applies also to the muscle-fibres of the contracting heart. The cardiac impulse arises in the sino-auricular node and then spreads over the auricular muscle in general and after that reaches the auriculo-ventricular node. It then passes along the bundle of His, its branches and terminal ramifications right into the ventricular muscle fibres. The excitation wave in so doing travels through the system and spreads first to the apex and then to the base of the ventricles. Because of the above mentioned facts regarding the passage of the impulse and because of the complicated arrangement of the cardiac muscle fibres, different parts of the heart muscle may be excited at the same time and may therefore contract simultaneously. The electrical phenomena will occur at each of the parts excited and contracting and they will spread from the heart to the rest of the body and if the current is taken off by a lead the effect on the lead will be by the composite of the potential variations occurring at the different parts of the heart muscle excited and contracting simultaneously. The arrangements of the leads and the connections of the electrodes are such that the current passes from the apical to the basal side of the heart outside the body that is through the galvanometer and the axes of all the three standard

leads are parallel to a standard plane which is transverse vertical and passes through the two shoulders and the left hip. (Pardee, 1933). For this reason the potential variations which are parallel to the standard plane will have maximum effect and those that are perpendicular to it will have minimum effects in the standard leads. Those that are intermediate will have proportionate intermediate values. Of all the electrical forces parallel to the standard plane, owing to the arrangement of electrodes, those that are directed from the basal to the apical side within the heart, will have an effect on the galvanometer such that the deflection of the string is recorded as an upward directed curve in the tracing as it is read. Similarly those that are directed from the apical to the basal side within the heart will have a reverse influence on the tracing. Those that are directed towards the same side are added together and those that are directed opposite to each other tend to neutralise themselves. If at any moment some of the forces are directed towards the apex and others towards the base then these will tend to neutralise each other to an equivalent extent and the influence on the galvanometer will be by the balance, be it directed towards the base or apex.

To put it in other words each part of the curve represents resultant of all the varied electrical forces generated in the different parts of the heart muscle at that particular time.

The Different Waves of the Electrocardiogram and their Causation. The value and direction of the resultant electrical potential is not same and on the other hand constantly varying throughout the cardiac cycle and so the tracing obtained by taking them off through the leads will be of a complex nature. The normal curve shows a number of waves some directed upwards and others downwards. These have been arbitrarily named P, Q, R, S, T and U, the last one being present only occasionally. (Their normal characters are given later). P and QRS are due to excitation and contraction—sum total of the first two phases of potential variations (mentioned in connection with the electrophysiology of muscular contraction), P being auricular and QRS group ventricular in origin. The last two phases of electrical phenomena contribute towards the production of an wave called T. The T of the normal electrocardiogram is absolutely ventricular in origin. The T due to auricular phenomena, which may be called the auricular T, is not ordinarily seen in an electorcardiogram as it, being due to the later phases of auricular events, becomes embedded in the QRS group which is due to the initial phases of ventricular events. In a heart with delayed conduction, where as will be mentioned later on there is increased P-R interval, the auricular T may sometimes be detected (Pardee, 1933).

Causes of Difference of Waves in Different Leads. When the resultant electrical potential is parallel to the standard plane, is directed from the base towards the apex within the heart and is in the line of the axis of a lead it shows a maximum effect in that lead causing an upward (positive) deflection in the curve. Other things remaining same when the resultant potential is directed from the apex towards the base within the heart it has a tendency to give rise to a downward (negative) deflection in the tracing, when it is perpendicular to the axis of a lead it has no effect on that lead. When it has an intermediate direction it has an influence on a lead to an extent represented by the value of its perpendicular projection on the axis of the particular lead. These facts account for the difference of the waves in the different leads and are made clearer in Fig. 3 and Fig. 4.

In these figures the angles A, B and C indicate the right and left arms and the left leg respectively. Within the triangle the arrow 'a' indicates the full value and direction of the current generated in the heart. 'b' 'c' and 'd' obtained by perpendicular projection of 'a' on the sides of the triangle represents in each case the current available for the different leads. AB representing lead I, AC lead II and BC lead III.

Thus in Fig. 3, 'a' has its full value in lead I, a considerable percentage of the full value in lead II and no value in lead III. In Fig. 4 the direction of current is reverse in all leads and so will exert a negative influence on the deflection of the galvanometer string to the extent of the available values as represented by 'b', 'c' and 'd' in the different leads.

FIG. 3

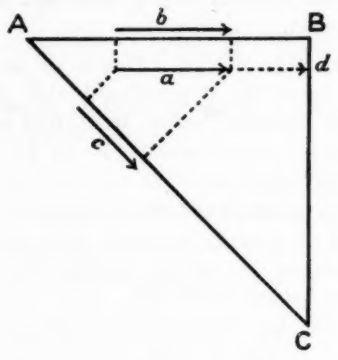
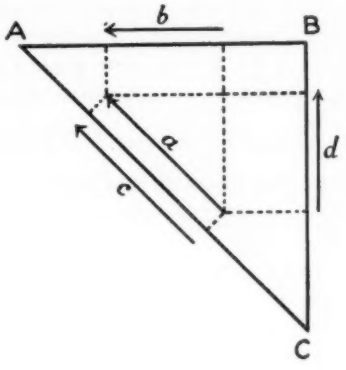



FIG. 4




SOME FACTS WORTH REMEMBERING: (1) Preliminary excitations are not recorded in the electrocardiogram, the current generated being far too small.

(2) When two leads are taken simultaneously the amount of current passing through one galvanometer is sufficient to diminish the amount available for the other, thus diminishing the amplitude of the curves—a distinct disadvantage.

(3) Record does not represent the full value due to short circuiting effect of tissues, only 2·3% of heart's potential is represented in the largest lead that is the lead showing the largest amplitude of the curves.

(4) There is diminished amplitude on inspiration, so the distance of the heart from the anterior chest wall has something to do with the amplitude, possibly because of short circuiting influence of the intervening tissues.

(5) The minute irregularities sometimes found in an electrocardiogram are due to the contraction of the somatic muscles and due to vascular alterations, these being due to nervous excitement and effect of cold in cold climates. They are recognised by their too frequent occurrence. They are avoided by the use of the resistance circuit and proper precautions.

## INTERPRETATIONS OF ELECTROCARDIOGRAMS AND ELECTROCARDIOGRAMS OF THE COMMONER ABNORMAL CONDITIONS

*Some important points about the Standard Electrocardiograms.* Horizontal lines. These are placed 1 mm. apart. 1 cm. = 1/1000 volt. Vertical lines. The interval between the thicker ones represent 1/5th second and that between the thinner ones represent 1/25th second.

*How to read an electrocardiogram.* Some general principles should be followed in every case; so however easy the diagnosis may be and even if it be obvious from the tracing the following things should be observed in order in every case and the conclusion drawn afterwards.

(i) Rate, (ii) Rhythm, (iii) Auricular complex, *viz.*, the P wave, its form, amplitude, duration, etc., (iv) The auriculo-ventricular conduction time that is to say the P-R interval—its duration, (v) The QRS group—form, amplitude, duration, etc., (vi) The S-T segment specially any deviation, (vii) The T wave—its form, amplitude, etc., specially any inversion. (viii) Any axis deviation (O. T. ventricular preponderance). [Axis deviation has been explained later]. (ix) Any other feature that may be peculiar to the particular tracing.

*How to find out the heart rate from the tracing.* A special form of divider is very serviceable in finding out the duration of a cycle or the individual waves, etc. The rate can be accurately determined where the rhythm is regular (equal spacing of beats) by noting the time taken by a single cardiac cycle. In cases of irregular rhythm a long stretch of the tracing is to be observed and the number of cycles during that time period noted; then the average duration of one cycle is calculated and from it finally the heart rate is found out. This, however, cannot be very accurate. As the interval between

two thick vertical lines represent 1/5th second and that between two thin ones represent 1/25th second, the rate can be easily calculated if the duration of one cycle is found out in relation to these lines. The following may be used as a rough and ready reckoner:

| *Duration of one cardiac cycle.* | *Rate per min.* |
|---|---|
| 1. Big spacing (interval between two thick lines) | 300 |
| 2. ,, ,, ,, | 150 |
| 3. ,, ,, ,, | 100 |
| 4. ,, ,, ,, | 75 |
| 5. ,, ,, ,, | 60 |
| 6. ,, ,, ,, | 50 |

A more detailed ready reckoner may be prepared stating the rate against the duration of one cycle expressed in relation to the number of smaller spacings (intervals between thin lines).

### The Normal Electrocardiogram

The characters of the normal electrocardiogram may be stated as follows:—

1. Rate—72 per minute or thereabouts.
2. Rhythm—Regular.
3. The P-wave—It is a rounded elevation with an amplitude (height) of 1-2 mm. and duration of about 1 second.
4. The P-R interval. This is an interval from the beginning of the P wave until the QRS group begins. It normally varies from 0·14 to 0·16 sec. When it is beyond 0·2 sec. it is to be considered definitely pathological.
5. The QRS group—Its duration is within 0·1 second and the average amplitude is about 1 cm. In the vast majority of normal subjects the amplitude varies from 7 mm. to 17 mm.

Q is slightly negative or iso-electric.

R is an upward sharp spike of greater amplitude than any of the other deflections.

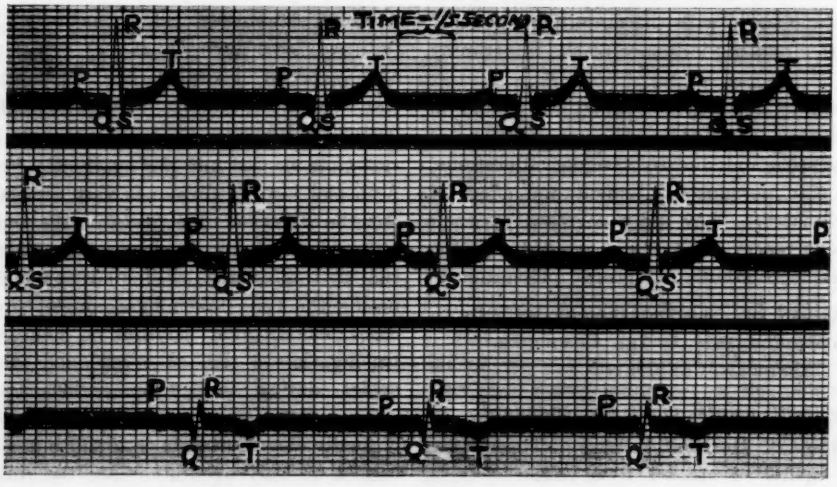
S is usually a negative wave.

The R is usually largest in lead II and the height of R in leads I and III are reciprocal.

Einthoven's law of the leads is as follows:—Excursion lead I + Excursion lead III = Excursion lead II.

6. The S-T segment—This is usually iso-electric.
7. The T wave—This is usually upright in leads I and II and also usually in lead III but in some

Fig. 5.



20% cases it is inverted in lead III, as is at times found in high position of the diaphragm.

8. The duration of QRST is 0·32 sec. or thereabouts.

9. There is no axis deviation (Axis deviation has been explained later).

10. Sometimes an U wave may be detected. It is a small positive wave following T.

(The characters of normal lead IV are described in connection with coronary thrombosis).

Fig. 5 represents the electrocardiogram of a normal subject showing inversion of T in lead III.

### Abnormal Electrocardiograms

Axis Deviations (O. T. ventricular preponderance)—

The direction of the chief excursion of QRS in each lead depends upon the direction of the largest potential of QRS within the body. This largest potential has been called by White the electrical axis of QRS. It is possible to determine roughly the direction of this axis from the measurement of the largest QRS excursion in each lead. Normally the electrical potential producing the peaks of R waves has a direction within the heart which lies between 30° and 90°.

Abnormally the electrical axis of QRS may be deviated to the right or left and accordingly we speak of right and left axis deviations. (Pardee, 1933). The features of the right and left axis deviations are as follows:—

Right axis deviation—

Lead I—Small R and prominent S.

Lead III—Large R and small S.

That is to say the largest deflections point towards each other in leads I and III.

Left axis deviation—

Lead I—Prominent and upright R and small S.

Lead III—Small R and prominent S.

That is to say the largest deflections in leads I and III point away from each other.

Right axis deviation is found in right ventricular hypertrophy, displacement of the heart towards the right, left ventricular extrasystole (sometimes) and right bundle branch block. Similarly left axis deviation is found in left ventricular hypertrophy, displacement of the heart towards the left (transverse position), right ventricular extrasystole (sometimes) and left branch block (New. terminology).

### Displacement of the Heart

Transverse position of the heart (relative to normal) *e.g.*, in high position of the diaphragm tends to give rise to large R in lead I and small R but prominent S in lead III (left axis deviation) and often an inverted T in lead III.

Vertical position of the heart (perpendicular heart) tends to give rise to low voltage in lead I and there may be right axis deviation.

Dextrocardia—Here all the waves in lead I are inverted and that is pathognomonic of the condition. Explanations are easy when one considers the axis of the heart (hence as often is the case, the axis of resultant potential) compared with normal.

### Arrhythmias—

*Sinus Arrhythmia*

The T-P intervals are not constant; there is progressive increase followed by progressive diminution (having a respiratory rhythm).

*Heart Block.*

A. Sino-auricular block.

From time to time the entire cycle is missing, otherwise the tracing is normal.

The electrocardiogram of a case of sino-auricular block is shown in Fig. 6.

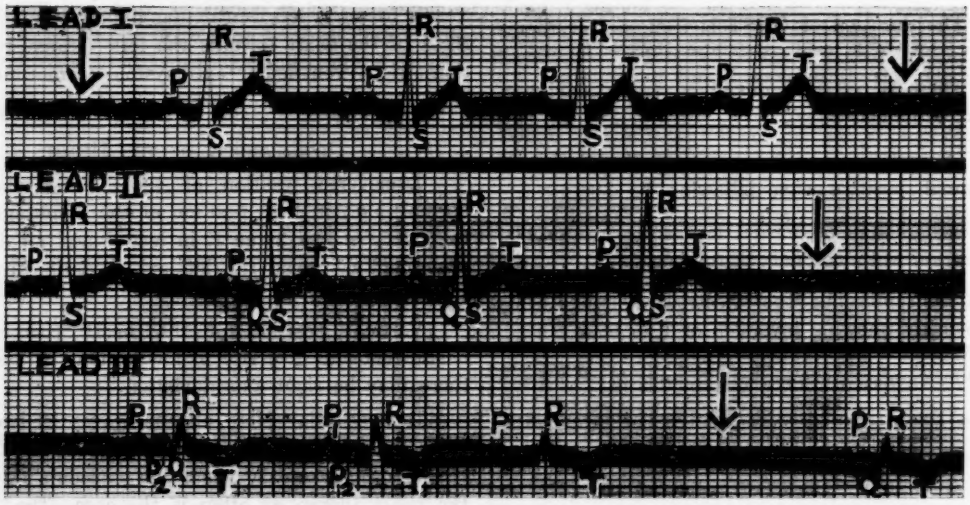
In the tracing the arrows indicate the sites of the missing beats.

B. Auriculo-ventricular block.

(a) First degree—simple delayed conduction. The P-R interval is increased (more than 0·2 sec.). The spacing of the cycle may be regular or irregular according as whether the delay is constant or inconstant.

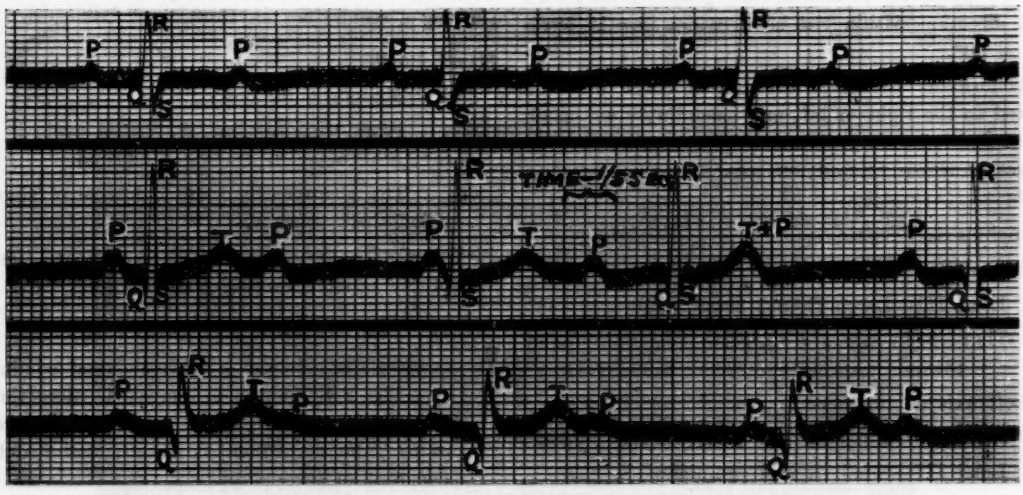
(b) Second degree—Here there is occasional failure of the ventricle to respond to the auricular impulse. (Partial heart block). From time to time, may be at regular or irregular intervals—

FIG. 6.




the P wave is not followed by the QRS group. On careful examination it will be found that the P-R interval progressively increases before the actual missing of a ventricular complex takes place. Fig. 7 shows the electrocardiogram of a case of incomplete heart block.

FIG. 7.



In the above electrocardiogram from time to time the P waves are not being followed by the QRS group and in places the P-R interval is found to be considerably increased.

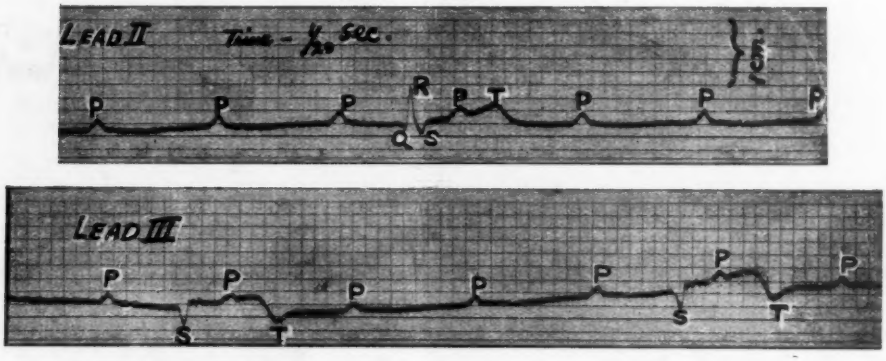
(c) Third degree—Complete heart block.

There is complete dissociation of auricular and ventricular complexes. The P waves occur at regular intervals and so do the QRS groups

but the rates of the two differ. It is to be noted that by coincidence some of the QRS groups may have a P wave before it but on careful examination it will be found that there is no true relationship between the P waves and the QRS groups and that there are many more P waves compared with the number of QRS groups. The rate of the QRS groups is usually somewhere about 36-40 to the minute.

The electrocardiogram of a case of complete heart block is shown in Fig. 8 (only leads II and III are shown).

FIG. 8.




C. Bundle branch block.

In this condition each ventricular complex which is preceded by a P wave of normal form is itself abnormal being of increased amplitude and diphasic. The initial part is formed by the QRS group and the terminal part by T wave (which is on the side opposite to the main deflection). The period of time occupied by the ventricular complex is increased. When the main deflections in leads I and III point away from each other they indicate left branch block and when they point towards each other they indicate right branch block. (According to old terminology it is just the reverse).

Explanation—The impulse that first stimulates the right ventricle (as in the left branch block) has to go from right to left near the apex of the septum in order to stimulate the left ventricle and this right to left passage gives rise to left axis deviation. Similarly right axis deviation occurs in right branch block.

( Explanation for old terminology was as follows :—When one branch is blocked the impulse first stimulates one ventricle by the healthy branch and then the other ventricle through the septum. The ventricle which is first stimulated was thought to show the preponderance).

Fig. 9 shows the electrocardiogram of a case of bundle branch block.

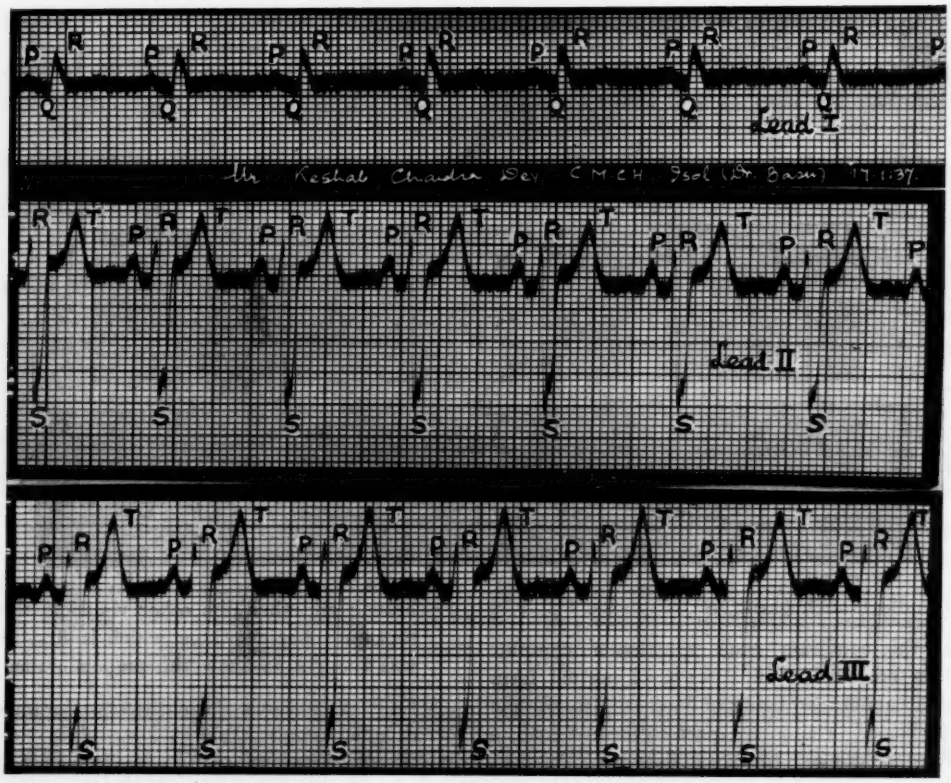
In this electrocardiogram the amplitude of excursions of QRS complexes in leads II and III are unusually large exceeding 3·2 cm. in lead III. In leads II and III these are distinctly diphasic and the T is in the opposite direction to the main ventricular dip. The QRS complexes are widened and measure about 0·12 sec. Definite notching can be marked in all the leads. The T wave is tall and pointed in leads II and III but is iso-electric and not discernible in lead I.

The features indicate intraventricular conduction defects. Lead I is not typical. It should strictly be called atypical bundle branch block. Apart from lead I the picture is one of left bundle branch block. (New terminology).

D. Arborisation block.

Some claim to be able to recognise this condition. The QRS group takes a longer time and

FIG. 9.




shows notching and splintering but as opposed to bundle branch block the T wave is often on the same side as the main deflection of the QRS group.

*Extrasystole.*

A. Auricular. The cycle occurs prematurely and is followed by the compensatory pause (except in the case of interpolated extra-systole). There is a P-wave which is abnormal and may be inverted. The ventricular complex being supraventricular in origin is normal in form. In blocked auricular extrasystole the abnormal P-wave is not followed by the ventricular complex.

B. Nodal. The ventricular complex is slightly if at all abnormal. The P-wave may precede with a lessened P-R interval or it may be embedded in the QRS group.

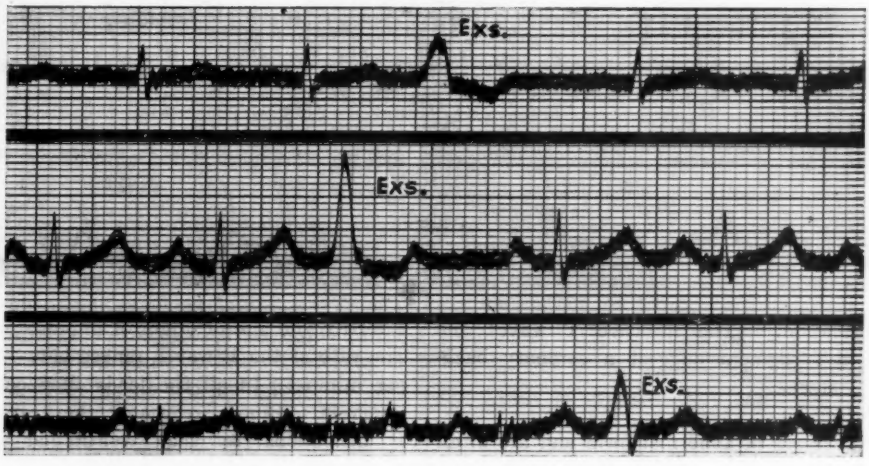
C. Ventricular. The ventricular complex is abnormal in form, is of larger amplitude and duration and usually diphasic. The corresponding P deflection occurs at the anticipated time but is usually embedded in the ventricular complex and may, rarely if at all, be detected.

In the extrasystole of right ventricular origin the chief deflection of QRS group is upward in lead I and either upward or downward in leads II and III depending upon the exact site of origin. The record shows normal or left axis deviation. In the extrasystole of left ventricular origin the major deflection of the QRS group is downwards in lead I and the other two leads may vary according to the exact site of origin. The record shows normal or right axis deviation.

The increased duration of the complex is due

to the impulse arising in one ventricle and having to traverse the septum in order to stimulate the other ventricle as in bundle branch block. The explanation of axis deviation is also similar to that put forth in connection with bundle branch block. Thus in premature beats of right ventricular origin as the impulse has to pass through the septum from the right to left there is a tendency for left axis deviation. An electrocardiogram with premature ventricular beats is shown below (Fig. 10).

FIG. 10.




In the above electrocardiogram there is a premature beat in each of the three leads marked 'Exs'. They are of right ventricular origin and the site of origin is probably high up near the conus arteriosus.

*Alteration of the Heart Beat* (Pulsus Alternans).

In this condition the complexes may be alternately of smaller and larger amplitude. The smaller beat may be responsible for the smaller or larger deflections. The alteration may not be discernible in the electrocardiogram. (Hence sphygmomanometer and sphygmograph are of greater value than the electrocardiograph for the diagnosis of this condition).

*Auricular Fibrillation.*

The electrocardiographic features of auricular fibrillation are as follows—

P-waves are absent and their place is sometimes taken by the so-called 'f' waves (fibrillation waves). The rate of the 'f' waves varies between 400 and 450 per minute.

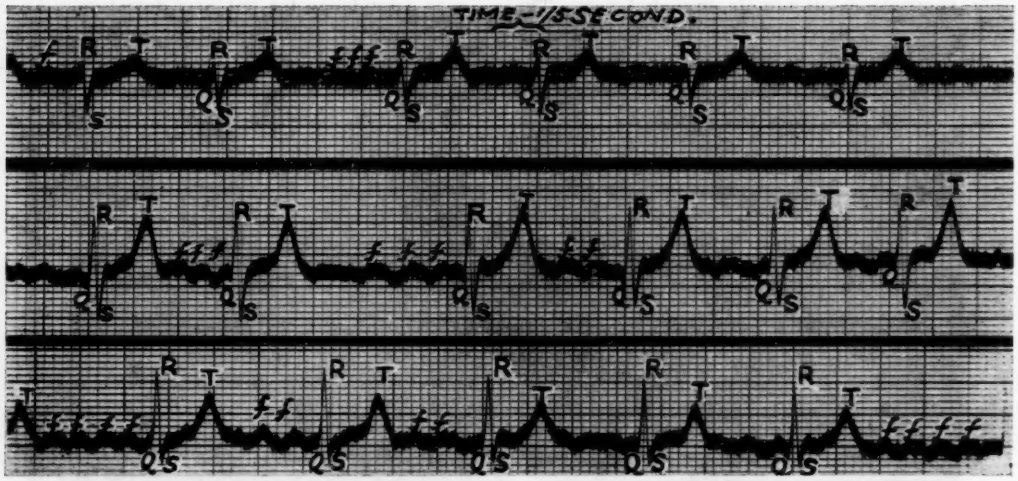
QRS groups—These occur at irregularly irregular intervals but are usually of normal forms (being of supraventricular origin). Their height and, to some extent, form vary greatly. The average rate of the ventricular complexes is between 90 and 140 per minute.

Electrocardiograms of auricular fibrillation are shown in Fig. 11 and Fig. 12.

In Fig. 11, the P waves are absent and in places the 'f' waves can be recognised. The ventricular complexes occur at irregularly irregular intervals. The T waves are unusually prominent in leads II and III. There is also right axis deviation.

In Fig. 12, also the P waves are absent and in places 'f' waves can be recognised. The probable rate of such undulations is 500 per minute. The ventricular complexes occur at irregularly irregular intervals. Their rate is approximately 120 per minute. There is one extrasystole in lead II. The T wave is negative in lead I, negative and diphasic in lead II and cannot be detected in lead III. There is left axis deviation. The S-T segment is below the iso-electric level in lead I. The features are of

FIG. 11.

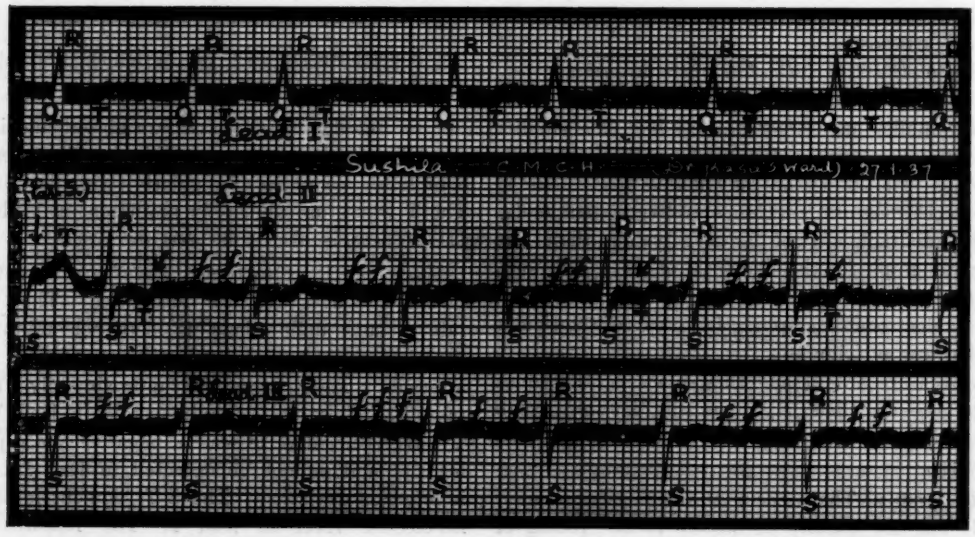



auricular fibrillation. (The negative T waves and deviation of S-T segment suggest a coronary background. See later).

*Auricular Flutter.*

The P waves are of abnormal form and are often inverted, the site of origin of impulse being abnormal. The rate of the P waves ranges between 280 and 300 per minute. In all the leads they occur at regular intervals. Almost invariably there are two or more P deflections to each ventricular complex. The

FIG. 12.



latter usually occurs at regular intervals and is of normal form, being supraventricular in origin. In some instances the T may be detected. Sometimes the ventricular complexes may occur at irregular intervals (impure flutter).

*Paroxysmal Tachycardia.*

Tachycardia of a paroxysmal nature may be due to the following:—

A. Paroxysmal fibrillation—That is paroxysmal attacks of auricular fibrillation. During the attack the electrocardiogram will show the features of auricular fibrillation.

B. Paroxysmal flutter—That is paroxysmal attacks of auricular flutter. An electrocardiogram taken during the attack will show the features of auricular flutter.

C. True paroxysmal tachycardia—This is due to a run of multiple extrasystoles and the following varieties are recognised according to the site of origin of the extrasystoles. The rate is usually somewhere about 180 per minute.

(i) Auricular or simple paroxysmal tachycardia—The condition may be said to be one of regular paroxysm of multiple auricular extrasystoles or in other words the beats are generated for the time being at a very rapid rate from some focus in the auricle which is other than the pacemaker—a condition of temporary shifting of the pace maker.

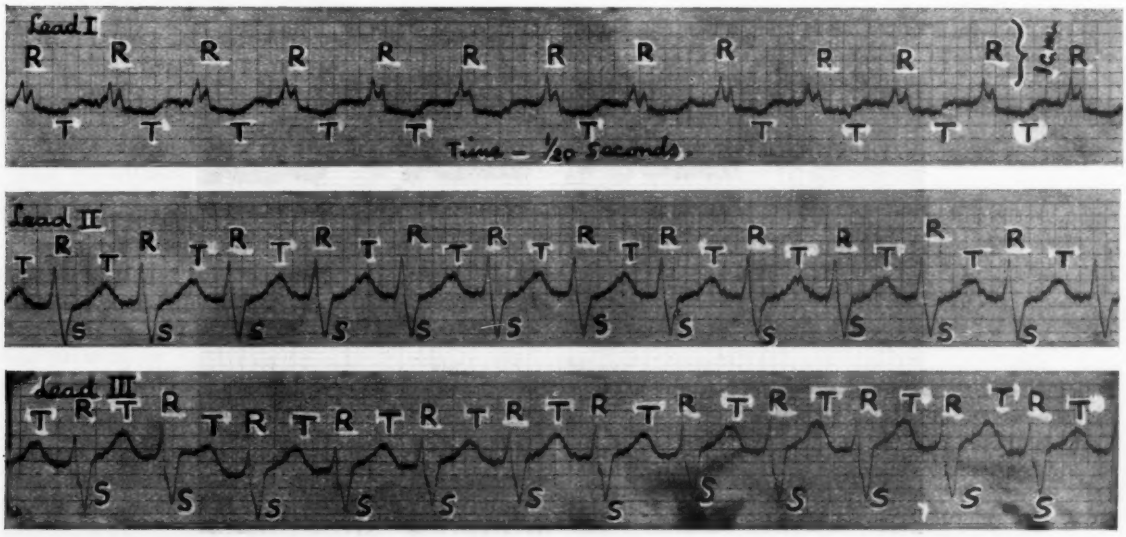
The ventricular complexes are of normal form and are preceded by P waves of abnormal form, usually there is one P wave to each ventricular complex unlike auricular flutter.

(ii) Nodal tachycardia—The electrocardiographic features are similar to above but the P wave is usually embedded in the ventricular complex and cannot be recognised.

(iii) Ventricular tachycardia—The ventricular complexes occur frequently and are of abnormal form and diphasic. The following is an electrocardiogram of paroxysmal tachycardia (Fig. 13).

In this electrocardiogram the P waves are lost in the ventricular complexes the rate of which is approximately 172 per minute. The wide and notched QRS group and the fairly large T wave directed opposite to the chief QRS

FIG. 13.



deflection indicate an origin in the ventricle probably the right ventricle, (ventricular paroxysmal tachycardia).

VALVULAR DISEASES.

*Mitral Stenosis*—The P wave shows increased amplitude; it is often broad and may have a flat top and may be bifurcated, all these being due to auricular hypertrophy. There is often right axis deviation due to the hypertrophy of the right ventricle.

*Aortic Regurgitation*—There is left axis deviation due to hypertrophy of the left ventricle and the curves are otherwise normal.

CONGENITAL HEART DISEASE.

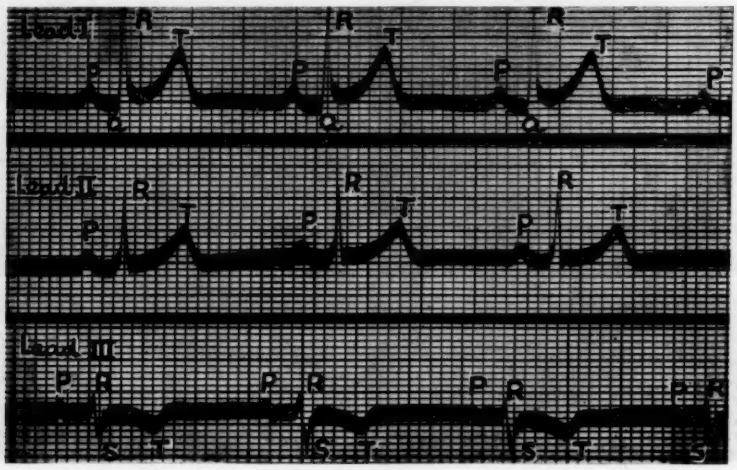
This shows right axis deviation because of right ventricular hypertrophy which so often exists in this group of diseases.

CORONARY THROMBOSIS.

In thrombosis of a coronary artery earliest changes occur in connection with R-T or S-T segment and may be noticeable within a few hours from onset. The R-T segment shows an elevation or depression (deviation) and the following T is usually of opposite sign and spiked, that is to say if there is elevation of the R-T segment in lead I there will be an inverted T in the same lead. This T is then called a coronary T. Another point is that the R-T or S-T segments are of opposite signs in leads I and III, that is to say, if there is an elevation in lead I there will be a depression in lead III and *vice versa*; such deviations of the R-T or S-T segment constitute what is called Pardee's sign. The R-T or S-T segment changes, as already mentioned, appear early but it takes some time for the inversion of T to occur, usual time being 5 to 10 days. In a case that is improving R-T or S-T segment changes disappear early but the altered T persists longer. The Q is often pathological. The Q is said to be pathological when its amplitude is more than a quarter of that of the maximum deflection in any lead. The type of curves with inverted T in lead I is called coronary thrombosis of $T_1$ type and the one with inverted T in lead III is called $T_3$ type. There are some who prefer to call these type 1 and type 3 respectively as they consider that the changes in Q and R-T segment are as important as the T. From the electrocardiograms it is not possible to say which coronary artery has been occluded, but, as is well-known, the anterior descending branch of the left coronary artery is the commonest one to be the seat of thrombosis.

In a doubtful case of coronary thrombosis lead IV is of value. The features of a normal lead IV are

FIG. 14.



diphasic QRS complex, a deep Q wave and a negative or diphasic T. Abnormality consists of absent Q wave, slurring of QRS complex and absent or upwardly directed T waves. Sometimes in coronary disease abnormality is found only in this lead and the abnormality in this lead persists much longer than in others. (Gibson, 1935) R-T or S-T segment deviation in lead IV is practically without significance by itself.

Fig. 14 is an electrocardiogram of a case of coronary thrombosis.

In the above electrocardiogram the R-T and S-T segments are deviated from the isoelectric level, the R-T segment is depressed in lead III. The T waves are prominent in all the leads and particularly so in lead I. The T waves in lead III are inverted There is distinct notching of the QRS group in lead III. There is also left axis deviation. The features indicate coronary thrombosis of $T_3$ type.

Coronary Insufficiency (not amounting to complete occlusion) and myocardial degeneration.

One or more of the following may be found:—

1. Prominent Q specially in lead III.
2. Low voltage of the main deflections in more than one lead.
3. Abnormalities in connection with the QRS group in the form of notching or slurring and increased duration.
4. A prominent T which may be inverted or extreme low voltage of T.

*ANGINA PECTORIS.*

There may be temporary inversion of the T waves during the attacks.

*DIGITALISED HEART.*

There is a dip of the R-T or S-T segment most marked in lead I. (Contrast with myocardial degeneration where it is most marked in lead II).

## Significance of the Various Abnormalities to be Found in Connection with the 'Different' Waves of the Electrocardiogram

After having described the characteristic features of the electrocardiograms of important conditions we may now append by way of summarising, the significance of the various abnormalities met with in connection with the different waves of the electrocardiogram.

### The P Wave

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Increased amplitude. | Hypertrophy of auricle, e.g., mitral stenosis. |
| Increased duration. | Same as above. |
| Notching. | Same as above but may sometimes be normal. |
| Inversion. | Abnormal origin of the auricular impulse, e.g., in extra-systole. |
| Diphasic character. | Auricular flutter and simple paroxysmal tachycardia. |
| Absence. | Auricular fibrillation. |

### The P-R Interval

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Increased. | Heart block. |
| Diminished. | Nodal rhythm (when P waves can be separately distinguished). |

### The Q R S Group

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Increased duration. | Bundle branch block, myocardial degeneration, extra-systole. |
| Increased amplitude and diphasic. | Ventricular extra-systole. |
| Increased amplitude, diphasic and all along practically of the same contour. | Bundle branch block. |
| Diminished amplitude (low voltage). | Myocardial degeneration. |
| Notching or slurring. | Same as above. |
| Maximum deflections pointing away from each other in leads I and III. | Left axis deviation (found in left ventricular hypertrophy, left branch block, right ventricular extra-systole, transverse position of heart). |
| Maximum deflections pointing towards each other in lead I and III. | Right axis deviation (found in right ventricular hypertrophy, right branch block, left ventricular extra-systole, perpendicular heart). |

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Peculiar and diphasic and all along of the same appearance with a very frequent heart rate. | Ventricular paroxysmal tachycardia. |

THE Q WAVE

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Large and prominent specially in lead III (more than a quarter of the maximum amplitude of any wave in any lead). | Myocardial damage may be found in coronary thrombosis. |

THE R WAVE

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Prominent in lead I and small in lead III. | Left axis deviation. |
| Small in lead I and prominent in lead III. | Right axis deviation. |
| Notching or slurring. | Myocardial degeneration. |

THE S WAVE

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Small or absent in lead I and prominent in lead III. | Left axis deviation. |
| Large in lead I but small in lead III. | Right axis deviation. |

THE R-T OR S-T SEGMENT

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Upward deviation in lead I and downward in lead III. | Coronary thrombosis of $T_1$ type. |
| Downward deviation in lead I and upward in lead III. | Coronary thrombosis of $T_3$ type. |
| Dip most marked in lead I. | Digitalis effect. |

THE T WAVE

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Large and spiked. | Myocardial degeneration. |
| Inversion. | Normal in lead III in some 20% of subjects and rarely in lead I. Inversion in two leads is more significant of a pathological condition than in a single lead. |
| | Invension in leads I and II or in leads II and III are suggestive of myocardial damage. |
| | Inversion of T may be caused by toxic condition such as uræmia and thyrotoxicosis and also by drugs, e.g., Digitalis, Quinidine, Morphine, etc. |
| Notching (this is rare). | Significance is not clear. May be found in toxic conditions of myocardium. |

THE T-P INTERVAL

| *Abnormality.* | *Significance or condition in which found.* |
|---|---|
| Progressive increase followed by progressive decrease. | Sinus arrhythmia. |

Though the significance of abnormalities in connection with the different waves of the electrocardiogram has been considered above separately the actual interpretation of a particular electrocardiogram should depend upon a consideration of all the abnormalities present.

Our thanks are due to Dr. J. N. Dutt of the Cardiology Department of the Carmichael Medical College Hospital for helping us by supplying the reprints of some of the electrocardiograms.

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# NEW IDEAS IN THE TREATMENT OF EPIDEMIC DROPSY

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AND

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In previous publications (Palit and Dhar, *Journ. Phy. Chem.*, 32, 1263, 1928; 34, 993, 1930; 36, 2504, 1932; *Zeit. Anorg. Allgem, Chem. Bd.* 191. *Heft* 3, 150, 1930) Palit and Dhar have made a systematic investigation on the oxidation of various substances by air in presence of sunlight. They have shown that carbohydrates, fats and proteins and many other substances such as citrate, tartrate, formate, lecithin, cholesterol and food materials like milk, butter, egg-white, egg-yellow, etc., can be oxidised by passing air at the ordinary temperature in presence of sunlight. They have further shown that in presence of sunlight, carbohydrates, fats and proteins can be completely oxidised by air at the ordinary temperature into their main endproducts, carbon dioxide and water, and that no intermediate compounds are formed in these photochemical oxidations. They have thus been able to imitate successfully the physiological processes of oxidations on which the animal life depends. These results on the oxidation of food materials by air and sunlight appear to be suggestive and the beneficial effect of light in the treatment of diseases may be due to an increased metabolism in light. From their researches they have come to the conclusion that the light absorbed by the system accelerates the metabolism of food materials in the body. Sunlight and artificial light have been used with great success in the treatment of tuberculosis, pernicious anæmia, rickets, beri-beri, etc. The treatment of disease by radiations has been practised since very early times and recent years have witnessed a great expansion in light therapy. It is believed that the rays which are absorbed by the skin, exert some special influence and that the beneficial results are not due merely to heating effect.

In other publications (Palit and Dhar, *Journ. Phy. Chem.*, 34, 737, 1930; 36, 2504, 1932; Chakravarty and Dhar, *Ind. Journ. of Medical Research*, 17, 430, 1929) Palit, Chakravarty and Dhar have shown that appreciable amounts of the compound of the peroxide type are formed when air in presence of sunlight is passed through aqueous suspensions of cholesterol, olive oil, cocoanut oil, castor oil, mustard oil, linseed oil, butter, etc. It has been observed that the substances can be retained in that activated or excited state for a sufficient length of time if kept in the dark. These compounds of the peroxide type thus formed induce the oxidation of the food materials mixed with them. Hence the antirachitic and beneficial properties of the substances when exposed to light and not containing the necessary vitamins, are due to the presence of peroxides which help the oxidation of food materials in the animal body. The substances can thus acquire antirachitic properties when exposed to light in presence of air and oxygen. In the light of the observations thus made, we can safely conclude that when the food materials are exposed to sunlight in presence of air, they take up oxygen forming some peroxide type of compounds, which can oxidise other food materials when mixed with them.

In several publications (Palit and Dhar, *Journ. Phys. Chem.*, 29, 799, 1925; 30, 937, 1936; 34, 711, 1930; 36, 2504, 1932) Palit and Dhar have shown that in the animal body the iron in the blood accelerates catalytically the oxidation of foodstuff by the peroxide formed in the body from the inhaled oxygen of the air. When there is a deficiency of iron in the blood, the animal becomes anæmic. At this stage any iron preferably of colloidal nature when taken into the system will supply the natural deficiency and the necessary amount of oxidation will take place thus showing the efficiency of iron preparations in deficiency and metabolism diseases.

Analysis (Palit, Kaul and Dhar, *Journ. Phys. Chem.*, 34, 737, 1930; 36, 2504, 1932; Dr. B. C. Guha, *Journ. Indian Med. Association*, Vol. IV, No. 11, 485, July, 1935) shows that common leafy vegetables contain iron and hence the usefulness of leafy vegetables in prevention of deficiency diseases is not only due to the presence of vitamins in them but also due to their iron contents and presence of other minerals such as calcium, phosphates, etc. Dr. Guha has shown that Lalsâk (Amarantus Spo), Gima sâk (Erythrœa roxburghii), Pooin sâk (Bassela Cordifolia), Kolmi sâk (Ipomœa reptaus, Hindi—Karmuna) and Palang sâk (Spinach olerace, Hindi—Palak) are fair sources of iron 0·03—0·02% in fresh green stuffs. Cabbage, Lal Sâk, Gima Sâk, Pooin Sâk are rich sources of calcium 0·018—0·15% in fresh stuffs. Patal (Tricosanthis dioica, Hindi—Parwal), Pooin Sâk and Dhenrosh (Hibiscus esenlenties, Hindi —Bhindi) are good sources of phosphorus 0·4—0·1% $P_2O_5$ in fresh stuffs. Palta (leaves of patol or parwal) is a particularly important foodstuff being usually rich in calcium 0·46%, iron 0·8%, phosphorus 0·25% $P_2O_5$ and protein 5·1%. These green leafy vegetables besides their mineral contents also contain Vitamins A, B, and C. Further analysis by Dr. Guha show that Bagoon (Solanum melongina, English—Brinjal, Hindi—Baigan) and Shank-alu (Pachyrhizus angultus) are good sources of Vitamin $B_2$. Among the pulses, Kanchamung (Hindi—Mung) is a rich source of Vitamin $B_1$ while Mator (Hindi—Matar, English—Peas) is the richest source of vitamin $B_2$. Mango is a fairly good source of vitamin B complex ($B_1$ and $B_2$) and is a very rich source of vitamin A. The vitamin content of banana is high. It has been found to be a good source of vitamins A, B and C. Analysis shows that bananas contain calcium, magnesium, phosphorus, sulphur, iron and copper. Country liquor or fermented palm or date juice is a good source of vitamin B complex and the liquor from the dates is a rich source of vitamin C. It is interesting to note that the conversion of cow's milk into curd instead of causing any loss of vitamin C serves actually to stabilise it.

Moreover as a result of experimental work (*Journ. Amer. Med. Association*, 103, No. 15, 1154, October 13, 1934, *Journ. Indian Chem. Soc.*, Palit and Dhar, 13, 502, 1936. *Indian Journ. Med. Res.*, 22, 1st July, 1934) during the last several years, the necessity of both iron and copper (in traces) in the cure of metabolic diseases such as 'nutritional anæmia,' beri-beri, epidemic dropsy and other diseases has been emphasised. Efforts have been made to cure such diseases by supplementing therapeutic doses of iron and copper. Nevertheless the known indispensibility of iron and the possible essential nature of copper lend interest to a recent investigation by Daniels and Wright and also by Palit and Dhar (*J. Nutrition*, 8, 125, 1934; 502, 1936; *Indian Journ. Medical Research*, 22, 1, 1934) of the requirements of these metals. All these conclusions have been corroborated in previous publications (Palit and Dhar, *Journ. Phy. Chem.*, 34, 737, 1930; 34, 2504, 1932 and Chakravarti and Dhar, *Indian Journ. Med. Res.*, 17, 430, 993, 1929) by our experiments on the metabolism of pigeons and rats using exposed (irradiated) and unexposed food materials, oils, juice of green leafy vegetables and sunlight.

The experiments on the metabolism of animals were further investigated with different lots of pigeons and rats with the addition of the following substances mixed with their diet (Rangoon rice) totally devoid of vitamin B:—

1. Rangoon rice only; 2. Rangoon rice mixed with juice of green leafy vegetables; 3. Rangoon rice mixed with exposed (irradiated) olive oil; 4. Rangoon rice mixed with unexposed olive oil; 5. Rangoon rice mixed with colloidal iron preparation; 6. Rangoon rice mixed with colloidal iron with traces of copper; 7. Rangoon rice mixed with a little amount of Bajra (Pennisetum typhoideum) and 8. Rangoon rice mixed with a little quantity of gram. The numbers 1, 7 and 8 were used to get sufficient amount of sunlight whilst the rest got no sunlight at all. The experiment lasted for a month.

The experimental results show that animals receiving normal diet and sunlight, *viz.*, No. 7 and 8 kept very good health. Even if the animals do not get vitaminous food but only sunlight, *viz.*, No. 1, they kept good health. Of course, the animals which got irradiated oil were much better than those getting iron preparations and unexposed oil. Still they were getting poorer in general health than those which 13, 502, 1936. *Indian Journ. Med. Res.*, 22, 1st is also found that iron in very small doses as are present in green leafy vegetables is beneficial to health. The results also show that iron in very

small doses containing traces of copper is as beneficial as the iron present in the green leafy vegetables whereas iron in larger doses is rather harmful to animals and cannot prevent polyneuritis. All these experiments confirm our view that sunlight acts as a promoter of oxidation of the food materials in the body and normal food with plenty of sunlight is the best for the maintenance of health. Palit and Dhar are of the opinion that in presence of sunlight the metabolism of food materials taken in the system is accelerated and that is how the disease is avoided. They believe that by the absorption of sunlight the body cells are activated and greater amount of oxidation of food materials takes place than in absence of sunlight. Hence we are of opinion that in these diseases which are caused by the want of proper metabolism, sunlight or artificial light should prove highly efficacious. All the experiments on photochemical oxidations are imitation of Nature's process of oxidation and throws considerable light on the process of life phenomenon.

In previous publications (*Journ. Phys. Chem.*, 29, 376, 1935; 33, 1897, 1929; 34, 737, 1930; *Chemie der zelle und Gewebe*, 12, 217, 225, 286, 1925; 13, 119, 209, 1926) it has been shown that many deficiency diseases like scurvy, pellagra, beri-beri, epidemic dropsy, rickets, pernicious anæmia, etc., are associated with gastro-intestinal disturbances or stomachic troubles. This fact supports our contention that the deficiency diseases are caused mainly by want of proper metabolism or oxidation of food materials through the lack of accelerators or promoters like vitamins, internal secretions, etc., which accelerate the oxidation of food materials by air in presence of oxidising enzymes in the body.

In carrying out feeding experiments upon animals, one cannot but realise that the balance between health and disease, even between life and death is actually under control. The scales are so sensitive that they have been swayed in one direction or the other by the addition or subtraction of seemingly trifling quantities of certain foodstuff. A growing animal provided with plenty of food can be stunted at will, made to decline to the point of death and restored with miraculous suddenness by slight readjustment of diet.

In this communication we shall adduce further evidences in favour of the above views and consider the results obtained from the experiments that have been carried on with deficiency diseases notably beriberi or epidemic dropsy with actual cases as it occurs in human beings. As to its occurrence and probable cause, a little historical introduction will not be out of place here.

### Short Historical Introduction About Epidemic Dropsy

The disease is mainly distributed throughout tropical and subtropical countries. This disease was for sometimes confused with another very common and probably older ailment 'beri-beri' which had a much wider area of distribution. Recent investigations (*Cal. Med. Journ.*, 32, 1, 1937) have, however, revealed that many of the so-called beri-beri epidemics have been outbreaks of epidemic dropsy. The epidemic characteristics of the disease have been fully recognised by all medical men since the early days of its inception. The disease when it makes its first appearance in any place is characterised by a typical epidemic wave, that is, starting from a small beginning, it gradually extends its area, attacks increasing number of men, reaches a climax and then wanes and finally vanishes. Seal and Dey (*Cal. Med. Journ.*, 32, 1, 1937) have shown that although the disease may not be contagious in the true sense of the term, the study of the epidemics, particularly in the recent ones in Bengal, Bihar and the United Provinces, has supplied sufficient evidences to show that it is communicable from person to person, as it spreads easily amongst the members of a family, institution or jail.

But the above argument, it seems to us, has been vaguely stated. No definite views have yet been advanced with regard to the nature of the organism, the portal of discharge, the transmitting agent, or the portal of entry. It also fails to give adequate explanation as to the spread of the disease in several cases. It has been observed by us as well as by several other workers that the introduction of the patients in an advanced stage of the disease into unaffected families is, in many instances, not followed by the development of secondary cases, even though the conditions are very favourable for the transmission of disease from person to person through contact. To test further the validity of this theory an experiment was conducted and it was observed

that common food rather than personal contact was the factor responsible for the incidence of the cases. (*Ind. Med. Gaz.*, LXXII, No. 8, 502, August, 1937; *Brit. Med. Journ.*, 1, 1110, May 29, 1937).

The tendency of the disease to run into groups has led many of the workers to consider diet, specially rice and mustard oil as the most probable factor in its etiology and even to-day it forms the most prevailing idea amongst the medical men in general. According to this school, it is believed that this disease is not communicated by contact and that owing to improper and badly stored or infected rice, some kind of fungi grow on the rice which act as a poison and cause the disease. According to this theory in its present advanced form, epidemic dropsy is caused by a water soluble toxin which is ingested with rice. Experiments carried by Drs. Lal and Roy (*Brit. Med. Journ.*, Vol. I, 1110, May 29, 1937. *Ind. Med Gaz.*, Vol. LXXII, No. 8, 502, August, 1937) conclusively prove the absence of any toxin or spore-bearing aerobes in the opaque part of the rice. It has been found that the habit of discarding water in which rice is boiled does not afford any protection against the disease as it would be expected if it were due to water-soluble toxin. On the other hand, more cases are found amongst those who reject rice water than among those who do not. Outbreaks of epidemic dropsy occurs as frequently amongst people using sun-dried and hand-pounded rice as amongst those taking parboiled and milled rice. There is no evidence of bad storage of rice as one of the factors associated with the incidence of the disease. The rice theory, therefore, totally fails to explain the observed facts.

There is another school of thought which believe that the occurrence of epidemic dropsy is due to poison present in the mustard oil; the mustard seed is mixed with other seeds as an adulterant which acts as poison. The mustard oil theory is also ill-defined inasmuch as no definite views have yet been advanced as to the nature or source of the substance in oil which causes the symptoms. Adulteration with cheaper grades of oil or even with mineral oil is suspected.

Lately the workers in the Calcutta School of Tropical Medicine from their recent researches and experiences in the outbreak of the disease at several places obtained the evidence in favour of the transmissibility of the disease through infected persons. Hence certain human agency, therefore, is mainly concerned in carrying the infection from man to man or from place to place but whether the disease is communicated directly or through some medium or media is not yet definitely known. In epidemiological investigations conducted by Dr. Lal and his collaborators at several places, there were evidences to suggest that the disease was probably due to infection and usually followed importation of cases. This is corroborated by the fact that frequent infection in jails is presumably due to the infection being carried through the infected persons transferred from one jail to another. On the whole, therefore, leaving aside the question of original generation or spread of the outbreak as unknown, the facts so far recorded justify to conclude that the epidemic dropsy is a communicable disease, though not contagious, and its diffusion is somewhat slow. This is the history that we know all about the epidemic dropsy and now we come to the actual cases.

In 1929 there were several cases of epidemic dropsy amongst the Bengali community of Allahabad. The staple food of these people was rice (milled) and fish and curry cooked in mustard oil. A similar outbreak of epidemic dropsy occurred at Calcutta amongst the Bengali communities in the months of August, September and October of 1926.

It should be remembered that the view regarding the origin of dropsy and beri-beri is more or less identical with the theory of origin of pellagra as advanced by Lombroso and Billardini in 1871. These authors believed that pellagra was caused by the consumption of damaged maize either by damp or being insufficiently cured and in that state it acts as a medium for the growth of poisonous fungi of different variety. In order to test the above view, pigeons in our laboratory were fed on samples of suspected rice but no indication of epidemic dropsy was detectable amongst the birds and the results obtained by us are quite in agreement with that of Dr. Lal and his collaborators. The view that beri-beri or epidemic dropsy is a metabolism disease is supported by the observations of Okada and co-workers (*Jap. Med. World*, 3, III, 102, 1923) and that starvation of vitamin B leads to decrease of basal metabolism in human beings. In previous publications, we have advanced the view that vitamin

B as well as pancreatic preparations should prove efficacious in epidemic dropsy which is likely to be caused by the break-down of carbohydrate metabolism.

Now we come to the actual cases of persons suffering from an attack of epidemic dropsy that we have come across and mention the system or the method of treatment based on the results of our biological investigations that have been followed:—

A Bengali family consisting of four members—husband (Patient A) with his wife (Patient B), his son (Patient C) and his brother (Patient D) came here from Benares two years ago with a virulent attack of epidemic dropsy in its advanced stage.

*Case I.* Patient A. This patient was a medical practitioner at Benares and was of about 45 or 46 years of age. He had œdema with flushed rosy skin of the legs which pitted on pressure and had also gastro-intestinal disturbances. He had heart as well as eye troubles. He did not like to undergo the Allopathic system of treatment and preferred to have the Ayurvedic system instead. The diet that he had been taking was bread, meat and some fruits occasionally but no rice of which he was greatly afraid. After about a month his condition did not seem to have improved much though his heart troubles decreased to a certain extent. Due to aggravation of eye troubles, his vision was diminishing almost everyday. At this stage he left this place for Lucknow. He underwent Homeopathic treatment there. He has now totally lost vision of both the eyes due to glaucoma, although all other signs or symptoms of beri-beri or epidemic dropsy have completely disappeared and he is quite well in every other respect. He has gained much in weight as well. He has now acquired a very irritable temperament and is always morose, this probably being due to loss of his vision.

*Case II.* Patient B. This patient is the wife of patient A just mentioned above. She was about thirty-five or thirty-six years of age and was in a very critical condition. Almost every moment she was passing through crisis. She complained of her heart troubles of very serious type. All over the lower part of the body as well as on her back and chest, she had innumerable red coloured eruptions—sarcoids full of blood as big as the size of a rupee. She had severe gastro-intestinal disturbances. The stool she was passing was of very corrosive nature. Later on, she developed piles and fissures from which blood was constantly oozing out. There was great swelling and severe pain in the local part. The very day she arrived from Benares, she had a very violent attack of heart-trouble and all of a sudden she became quite pulseless and the heart-beat practically stopped. Immediately she was given several injections such as camphor in oil, digitalis with strychnine, adrenaline, etc., and amyl nitrite capsule was given for inhalation but with no effect. Finally as the last recourse, she was given injection of adrenaline in her heart when the heart beat and the pulse revived. Later on she developed all sorts of complications such as severe pain all over her body and dysentery and lastly she developed pneumonia. The blood examination report shows the following:—

Total Leucocyte Count—16,060 per c.cm.

Differential Count—

| | | |
|---|---|---|
| Polymorphonuclears | ... | 82% |
| Large mononuclears | ... | 2% |
| Lymphocytes ... | ... | 16% |
| Eosinophils ... | ... | nil. |

Blood film—No peripheral parasites and no abnormal cells.

The system of treatment was:

1. Injection of calcium—every alternate day.
2. Calcium lactate—15 grs. twice daily with milk.
3. Acid mixture—Nitromuriatic dilute or phosphoric acid dilute 15 minims twice daily after food.
4. Makaradhwaj—One grain with honey and extract of Arjun in the afternoon.
5. Freshly fermented palm juice—4 ounces every four or five hours.
6. Exposure to ultra-violet radiations every day for 10 or 15 minutes at a distance of 3 feet from the lamp all over the body, specially all over the sarcoids excepting the head and face and also over the rectum for five to ten minutes from the same distance.
7. For swelling and pain in the rectum, she was prescribed the application of Hadensa and afterwards Adrenaline-ointment by P. D. in the rectum.
8. When there was sunlight the patient was exposed to the sun for half an hour and was rubbed

with oil all over the body. This was done when the patient felt better and gained some strength.

9. During pneumonia and other complications, she was kept under specific treatments and only on liquid diet. She was given enough of milk and ghole (Hindi—Mattha) prepared from curd.

10. Diet—rice (Bhat) prepared from freshly hand-pounded rice with red pericarp over it, milk, ghole, green leafy vegetables, such as palak, salad, mathy, bathua, chuola (gram or *chana*), kalmi-sâk (Hindi—karmoa), palta (leaves of parwal), boiled patal or parwal, bread prepared from whole wheat as well as that prepared from bajra, meat, liver, etc., and fruit juice such as orange, grapes, pomegranate, pineapple, sweet lemon, tomato, and fruits like mango, banana, bael, carrot, raddish, cucumber, etc., and irradiated shaddock (Betapilebu), apples cut in slices. Mustard oil was totally avoided.

Slowly she began to progress quite satisfactorily. The œdema of the legs and the sarcoids began to subside and finally disappeared. The swelling and pain in the rectum also subsided slowly and the patient became quite normal in the course of a month or so. The highly swollen legs became as thin and lean as ordinary sticks and her body was almost reduced to a skeleton. But she recovered very quickly and gained much in weight within another month. She has had no further trouble since then and is now enjoying perfect and good health.

*Case III.* Patient C. This patient was the son of patient A and was about 20 years of age. The attack in his case was not so serious as those of A, B, or D. He had still slight œdema of his legs and erythema all over the lower part of the body and in abdomen. His face as well as his body became dark and looked quite flushed. He was a little bit constipated and had severe breathlessness due to heart trouble. The treatment was exactly the same as that of his mother (Patient B). He was also given Cardiazol, Lacarnol and adrenaline by mouth. The patient recovered very quickly as he had no further complications. He has had no further trouble since then and is now keeping good health.

*Case IV.* Patient D. This patient was the brother of patient A and was about 32 to 35 years of age. He had all the symptoms of epidemic dropsy and the whole of his face and body became perfectly black. He was unluckily wrongly diagnosed to be suffering from Kala-azar and was being treated for the same. He lastly developed pneumonia and passed away within three weeks after his arrival from Benares.

In the beginning of 1935, several cases of epidemic dropsy broke out at Allahabad. It first made its appearance in a local girls school from where a girl of the first author of this publication contracted this disease. This spread to four or five members of the same family including the author himself within two weeks. Immediately the following steps were taken:—

A. Mustard oil from bazar was totally discarded.

B. The patients were given 4 ounces of freshly fermented palm juice every five hours and calcium lactate by mouth twice a day with milk.

C. The diet that was followed was strictly that as in the case of patient B, specially the bread or cake prepared from bajra.

D. The patients used sufficient quantity of milk and ghole.

In a week's time all the patients quickly recovered and they are now keeping good health.

This disease has again made its appearance here in an epidemic form since July last and has spread all over the town. The cases that we are coming across are being treated exactly in the same way. The mustard oil from the bazar has been totally discontinued in every case. It has been noticed that families using Ghosal's oil from Colonelgunj (Allahabad) have invariably got the disease. The analysis of the oil from his shop revealed the presence of HCN (hydorcyanic acid) and the amount of hydrocyanic acid and acid value of the oil was as high as 0·7% and 21·5—26·5 respectively, whereas the analysis of the oil extracted from pure yellow and healthy seeds as used by us revealed the presence of normal constituents only, namely hydrocyanic acid 0·02% and acid value 2—3·5.

As an experimental measure, we are using oil extracted from yellow variety of good mustard seeds. There has not been a single case of epidemic dropsy in any family where this oil is being used. It, therefore, seems to us that pure mustard oil as used by

us has nothing to do with this disease and is not responsible for its causation or outbreak. Most of our patients have completely recovered and some are now progressing satisfactorily and are on their way to recovery. There has not been a single case of failure where this treatment was strictly followed or adhered to. Burnt or roasted green and tender maize (Bhutta) has been found to be very helpful and efficacious.

### Discussion

From the researches of Palit and Dhar on the photo-oxidation of food materials by air and sunlight at the ordinary temperature we conclude that the light absorbed by the system accelerates the metabolism of food materials in the body. The person has thus a sense of well-being and fullness of life, when exposed to light, thus the metabolism being increased. Hence light acts as a preventive and the disease is thus avoided in its presence. Sunlight is appreciably transmitted by the epidermis and by the absorption of light the body cells are activated and hence increased oxidation of food materials takes place. The increase in the metabolism of food materials due to their increased oxidation by oxygen respired, aided by radiations, which penetrates the body, is perhaps the most fundamental action of light, which leads to the prevention and cure of disease when a person is exposed to light. It is pretty well accepted on all hands that several diseases are due to defective metabolism and therefore sunlight would prove efficacious in the treatment of these diseases. The light absorbed by animal body accelerates the oxidation of food materials and diseases like beri-beri, epidemic dropsy, rickets, sprue, gout, anæmia, diabetes and so on, which originate with defective metabolism of food materials, should be prevented or cured by light treatment. We emphasise the importance of sunlight in the treatment and prevention of deficiency and metabolism diseases and it seems likely that rickets, osteomalacia, pellagra, gout, diabetes, pernicious anæmia, epidemic dropsy, cancer, etc., would have been more common and prevalent in poor tropical countries like India and China, had not the compensating agent sunlight been present. Thus in actual practice sunlight or ultraviolet radiation is used either as a principal remedial agent or as an adjuvant to other therapeutic measures.

It seems certain that visible ultraviolet rays stimulate the hæmopoietic system. Sunlight, ultraviolet radiation and heat increase the lymphocyte content. The effect of ultraviolet light on human blood is to increase the red and white corpuscles, hæmoglobin and lymphocytes and markedly the eosinophilic cells. The bactericidal and immunising power is also increased.

In the light of the observations made with food materials exposed to sunlight in presence of air, we conclude that they take up oxygen forming some peroxide type of compound, which can readily oxidise other food materials mixed with them. Consequently the addition of exposed substances such as irradiated shaddock (Batapi Lebu), oranges, apples, food materials, etc., to ordinary food stuff facilitates the proper ingestion of food materials and produce efficacious results.

Calcium salts are very important in many body reactions and have been assumed to be an important agent in counteracting infection and repairing the damage of the tissues caused by disease. Moreover, it acts as a stimulant to the heart or in other words, it acts as a tonic for heart. Fatigue occurs when there is lack of calcium salts. Calcium and phosphorus metabolism are influenced by relatively longer ultraviolet and visible radiations the best results being obtained from radiations 3022 to 2600A°.

Animal life is assumed to depend essentially on the catalytic activity of the enzymes and iron in the animal body; and iron in the blood accelerates catalytically the oxidation of food materials. It is likely that in the animal body there exist readily oxidisable substances such as enzymes containing traces of iron in complex colloidal condition and the oxidation of these substances induces the oxidation of food materials. We have already shown that common leafy vegetables contain iron and hence the usefulness of leafy vegetables in the prevention of the deficiency diseases is not only due to the presence of vitamins in them but is also due to their iron content.

The excellence of green vegetables lies in the green substance called the chlorophyll, which has long been known to the scientists as the organic complex compound which causes the plant to be green. Recent researches have shown that this chlorophyll is similar in composition to human blood. Dr. Frank M. Schertz of U. S. A. has succeeded in

isolating chlorophyll in pure form and his analysis shows that it contains carbon, hydrogen, oxygen, nitrogen and magnesium. The chief chemical difference in the organic construction of the green chlorophyll is that it contains magnesium, while the hæmin —the red pigment of the blood contains iron. In all other respects the two are quite identical. The western physicians are now giving "pills of chlorophyll" to their patients and the practice is reported to have given satisfactory and remarkable results in certain types of anæmia and digestive disturbances. Prof. Buerji of Berne has shown that the good effect is due to the presence of chlorophyll which enriches the blood very quickly. The red cells immediately increase in number and the hæmoglobin content rises. Hæmin—the red pigment of the blood and chlorophyll —the green pigment of plants are practically identical. The blood enriched and reinforced is thus able to bring about recoveries which are both normal and natural. Thus the eating of green vegetables is taking chlorophyll in the body's chemical laboratory. Taking it in concentrated form is merely a method of giving the body a tremendous amount which thus quickly improves the blood. The sunshine that the plant gets is passed on in the form of blood-life for the human being.

Recent researches (Palit and Dhar *J. Indian Chem. Soc.*, 13, 502, 1936; 11, 471, 1934; 11, 661, 1934. *Science and Culture*, 1, 363, 1935) have shown that the traces of manganese are of great importance in many animal and plant processes. Palit and Dhar have also shown that minute traces of copper stimulate also markedly the induced oxidation of food materials. Traces of copper have also been found to be helpful in many plant and animal processes. It appears that traces of copper, manganese, etc., are to help the oxidation of food materials in plants and animals and thus help their healthy growth. Hence it appears that in the treatment of the metabolism diseases or anæmia, the addition of traces of copper salts to iron or manganese may be useful.

Analysis of banana shows that it contains traces of copper besides other minerals and vitamins. Since magnesium, iron and copper are active in the formation of that part of the blood (hæmoglobin) which carries oxygen to the tissues, banana may be regarded as rich in hæmoglobin-building elements. The therapeutic value of the banana has been summed up by Von Noorden thus:—"Its readily assimilated sugars along with vitamins and minerals make it of value in infant feeding. Its calorific value added to its vitamin and mineral content make it of value in the treatment of malnutrition. Its low protein and salt content along with its high carbohydrates make it useful in the diet of patients with disease of the kidneys. Its alkaline residue tends to combat acidosis. Its vitamin content is of value in preventing deficiency diseases. Its soft texture and blandness are of value in the treatment of intestinal disorders. Its low fat content and satiety value make it of value in reducing diets in the cure of obesity." Hence we are of opinion that leafy green vegetables and fruits containing iron and copper along with vitamins will naturally be found efficacious in the treatment of metabolism diseases.

The recent congress held at Hague in Holland in June last was the International Congress of Agriculture. In the section of milk and its products, a very important and useful discussion took place and it was observed that those who took about a pint of milk every day kept excellent health and avoided diseases. It was also pointed out, on the other hand, that beri-beri and epidemic dropsy usually occurred in families which took milk in very small quantity only in tea or coffee. This was a very important conclusion in the view of the fact that epidemic dropsy and beri-beri were creating havoc not only in families depending chiefly on rice but also on those taking bread or wheat. In this connection we may point out that all the cases mentioned in this publication have been practically using no milk or its products at all except a very little quantity with tea. The usefulness of milk in sufficient quantities is quite self-evident.

We have already mentioned that the 'rice theory' totally fails to afford explanation of the observed facts. As regards the 'mustard oil theory,' there seems to be some dispute over this. This theory is also ill defined inasmuch as no definite views have yet been advanced as to the nature or the source of the substance in oil which causes the symptoms. Experiments carried on by Dr. Lal and his collaborators (Dr. Lal and Dr. Roy—*Ind. Med. Gazette*, LXXII, 502, August, 1937) show that the disease commonly known as epidemic dropsy is caused by some unknown substance or substances

which enter the system through the ingestion of food cooked in certain consignments of mustard oil, which may be quite pure or genuine and unadulterated. The nature of the poisonous substance as suspected from the experimental results is not known. There is some evidence in favour of the view that deleterious substance is not a normal constituent of mustard oil and that it is more likely to be a chemical poison rather than something in the nature of living virus.

The experiments carried on by us conclusively prove that mustard oil as obtained from healthy and pure mustard seed (yellow variety) has nothing to do with the causation of the disease and is not responsible for epidemic dropsy at all. We have been constantly using pure and freshly prepared mustard oil in some families afflicted with this disease with no ill effect at all. Some consignments of mustard oil which might have been adulterated with some other cheaper brand oil or mineral oil or extracted from mustard seed insufficiently cured or decomposed or damaged or extracted from mustard seed mixed with some other kind of seed or seeds or kept in a damp place for a sufficient length of time thereby absorbing moisture, may be responsible for the disease due to the poisonous effect on animal body. This poison may go on accumulating and when it reaches its optimum, it breaks out in the form of disease. The poisonous effect of the adulterated mustard oil may be due to the poisonous or deleterious substance present in the adulterant or may be due to the chemical decomposition of the pure oil stored in unhealthy and damp places and the consequent formation of a poisonous substance by its decomposition.

Dr. Lal has suggested that some sort of deleterious substance which is more likely to be a chemical poison rather than a living virus, is formed but he has not been able to give an explanatlon for its formation. We may offer the following explanation for the formation of a chemical poison.

The mustard oil, truly speaking, is not a pure oil in its true sense of the word. It contains allyl-isothiocyanate, *i.e.*, an ester of isothiocyanic acid. It is quite possible that due to hydrolysis by dampness and moisture present or due to decomposition by bacteria in the seeds, the oil might form hydrocyanic acid as one of its products of hydrolysis or decomposition. Thus a very small quantity of hydrocyanic acid may be formed in adulterated oil. As the oil is consumed the hydrocyanic acid goes on accumulating thus producing the symptoms of epidemic dropsy, such as œdema, gastro-intestinal disturbances, etc. We have already mentioned that the analysis of several samples of bazar oil (adulterated or decomposed) reveal the presence of hydrocyanic acid. We are now carrying on some more feeding experiments with animals using pure as well as bazar samples of mustard oil. We are also studying the chemical properties of the substance or substances as obtained by the hydrolysis of the oil by moisture or by its decomposition at high temperatures. From the experimental results we will then be able to come to a more definite conclusion.

Pasricha and his collaborators (1936) claim to have discovered antibodies in the blood of the epidemic cases against a gram-positive spore-forming bacillus isolated from their stools, while such antibodies are said to be absent in the healthy controls. But to what extent this bacillus and antibody actually help in the causation and cure of the disease is still to be worked out and seen.

We find that damp houses, damp atmosphere (high relative humidity) have got something to do with epidemic dropsy as was evidenced in the recent outbreak of this disease at Benares and Allahabad. We are also of opinion that epidemic dropsy gains its virulence during the monsoon.

We are of opinion that destitution, privation, extreme exposure to cold and damp, fatigue, previous attack of malaria, general rundown after some ailments or any other debilitating condition, which usually lowers the resistance or vitality of a man or woman, seem to determine the incidence of the disease to a certain extent. From a critical examination of typical cases and the corresponding diet, it appears that this attack of epidemic dropsy is due to malnutrition and want of vitamins aided by humidity and insanitary conditions. It is interesting to note that the working classes in India (not the working classes in mills and factories) who have more or less an outdoor life and eat several raw things like onions, radishes, cucumber, green maize, fruits, etc., do not suffer from deficiency and metabolism diseases, as much as the lower middle classes who have to lead an indoor life because of their clerical and other indoor duties and do not get as

much exercise and sunlight as the working classes do. Unlike the working classes, they cannot stand raw things due to indigestion and suffer constantly from deficiency and metabolism diseases.

## Summary

1. Sunlight or artificial light should prove useful in the treatment of deficiency and metabolism diseases like beri-beri, epidemic dropsy, scurvy, pellagra, gout, diabetes and so on; because by the absorption of light the body cells are activated and hence increased oxidation of food materials takes place.

2. Epidemic dropsy is not caused by fungi or any poisonous substance in rice.

3. Iron preparations, specially of colloidal nature, should prove efficacious in the treatment of deficiency and metabolism diseases, because in presence of iron, the oxidation of the food materials by air is greatly increased.

4. Substances such as oils, butter, carbohydrates and other food materials can acquire anti-rachitic properties when exposed to light in presence of air forming compounds of the peroxide type and consequently the addition of these irradiated or exposed substances to ordinary foodstuffs facilitates the proper ingestion of food materials and produce efficacious results.

5. In the treatment of metabolism diseases like beri-beri, epidemic dropsy, anæmia, etc., the addition of traces of copper salts to iron or manganese is very helpful.

6. Calcium salts are very important in many body reactions and helpful in counteracting infection and repairing the damage of tissues caused by diseases.

7. Iron and other minerals, such as calcium, phosphorus, manganese, magnesium, etc., as are present in green leafy vegetables, fruits and other vegetables, are very efficacious in such diseases. Tender maize (Bhütta) and bajra are found to be very helpful.

8. Fresh and pure mustard oil as obtained from healthy mustard seeds (yellow variety) has nothing to do with the causation of beri-beri or epidemic dropsy and is quite harmless, but the bazar oil-adulterated, decomposed or badly stored in damp atmosphere may be responsible for the disease as the analyses of such oils reveal the presence of hydrocyanic acid as high as 0·7%, whereas the same in pure and fresh oil is about 0·02%.

9. The consumption of milk in sufficient quantity is very helpful in the prevention of diseases like beri-beri, epidemic dropsy and other diseases of metabolic origin.

10. Defective carbohydrate metabolism may be the probable cause of beri-beri and epidemic dropsy.

11. General run-down or any other debilitating condition which usually lowers the resistance or vitality seems to determine the incidence of the disease to a certain extent.*

* Read at the meeting of the I. M. A., Allahabad Branch, on the 6th September, 1937.

# ON THE POSSIBILITY OF TREATING TYPHOID FEVER BY VENO-TYPHO-PHAGE

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It is unfortunate that the medical science has not offered many items of effective direct attack against B. typhosus. Physicians have been treating cases of typhoid fever, more or less symptomatically, with a policy of wait and watch, in the absence of a specific therapeutic agent. The object of this paper is to discuss the possibilities of treating typhoid fever by a specific therapeutic agent namely, Veno-Typho-Phage, *i.e.*, typhoid bacteriophage specially prepared for intravenous use, with a very low protein-content.

It is generally agreed that the principal mode of action of bacteriophage in the fight against infections is by disintegration of the pathogenic organism with which it comes in contact. Therefore to be of any real use in a septicæmic disease, the bacteriophage must be introduced directly into the blood stream where it may have the opportunity of exerting its specific effect on the offending organism. Since the introduction of bacteriophage therapy, the method of oral administration has been extensively followed, and although brilliant results have been obtained in some cases of intestinal infections, such as bacillary dysentery, this method has proved almost disappointing in cases of typhoid fever. This failure of bacteriophage therapy in typhoid fever so far attempted, may, in a large measure, be attributed to not recognising fully the septicæmic nature of the disease and not administering bacteriophage by the intravenous route, which should be the route of choice in these cases.

The idea of administering bacteriophage by the intravenous route is not altogether a new one. It perhaps first originated with the work of McNeal and Frisbee who tried this method in cases of staphylococcus septicæmia with considerable amount of success.[1] Their idea has been subsequently taken up by well-known workers in different parts of the world and a large amount of data, both experimental and clinical, is accumulating in favour of this new form of phage therapy. Perhaps it will not be out of place to mention here the following extract from the Medical Annual, 1937:—"G. Artaut records six cases in patients aged from 26 to 52 in whom staphylococcus septicæmia was treated by intravenous injection of d'Herelle's bacteriophage in doses ranging from 2 to 50 c.c. All made a good recovery."[2] A few cases of carbuncle have also been successfully treated with intravenous staphylococcus bacteriophage only, in different hospitals in Calcutta and in private patients as well.

Apart from cases of staphylococcus septicæmia, good results have also been obtained with this form of therapy in a few cases of meningococcus septicæmia by the administration of the specific phage by intravenous as well as intrathecal route. A few case records of intravenous meningococcus phage treatment were published in the *Indian Journal of Pediatrics*.[3]

Typhoid fever is essentially a septicæmia. The causative organism (Eberth's bacillus) is present in the blood before the appearance of the earliest symptoms. That it is not a purely intestinal affection but represents the secondary localisation of a generalised infection produced by a specific bacillus has been recognised beyond all shades of doubt.

"The usual mode of entry of B. typhosus in man is by the alimentary tract. The bacilli pass from the stomach, when it is empty and the acid content low or possibly when the acid is diluted by a large draught of contaminated water. They thus gain access to the alkaline contents of the upper part of the small intestine and are bathed in the bile secreted from the common duct; here they multiply to some extent and it has been stated that at this stage they have been isolated from the fæces but it is doubtful if B. typhosus, at any rate, can multiply in the intestinal contents. If the individual is not immune,

the bacilli pass rapidly through the wall of the intestine, specially at the lymph follicles and Peyer's patches and gain access to the lymph spaces, mesenteric lymph glands and the spleen; here they multiply rapidly and at this particular stage of the incubation period of the disease, give rise to vague symptoms of headache and malaise. From these lymph spaces they are carried into the lymph stream through the thoracic duct and thus enter the general circulation. Many are at once destroyed; toxins are set free or elaborated and give rise to the initial stage of fever. The bacilli are carried by the blood all over the system—to the liver, spleen, bone-marrow and gall-bladder; from the liver they are carried by the bile to the gall-bladder and to the intestines where about the end of the first week or the beginning of the second, they appear in the fæces in large numbers. The bacilli are later on carried in the blood to the kidney and multiply in the pelvis of the kidney and in the urine in the bladder and are then voided at about the end of the second week of the fever or the beginning of the third week, in urine.

A septicæmic type of intermittent fever has been described and has been met with in India, in which there may be no intestinal symptoms whatsoever, the bacilli gaining entrance to the blood stream directly by the lymphatics of the tonsils and throat."[4]

### Blood Culture

"Coleman and Buxton reported their researches upon 123 cases and at the same time analysed all cases previously reported. Their analysis of blood cultures taken at different stages of the disease is as follows:—

Of 224 cases, during the first week, 89% were positive.

Of 484 cases, during the second week, 73% were positive.

Of 268 cases, during the third week, 60% were positive.

Of 103 cases, during the fourth week, 38% were positive.

Of 58 cases, after the fourth week, 26% were positive.[5]

From this report it is evident that typhoid phage will get the best chance of showing its worth if introduced into the blood vessels during the early weeks of the disease.

### Stool Culture

"Reviewing the data collected by a number of investigators, it seems probable that the bacilli do not appear in the stools, at least in numbers sufficient for recognition, much before the middle of the second week or in other words, as pointed out by Hiss, about the time that the intestinal lesions are well advanced and ulceration is occurring. Hiss, in an investigation of the subject, obtained the following results:—

1st to the 10th day (inclusive) 28 cases examined; Typhoid bacilli isolated from 3. Percentage of positive cases—10·7.

11th to the 20th day (inclusive) 44 cases examined; Typhoid bacilli isolated from 22. Percentage of positive cases—50.

21st day to convalescence—16 cases examined; Typhoid bacilli isolated from 13. Percentage of positive cases—81·2."[6]

### Mode of Treatment Advocated

*Treatment of early cases during the first week.*

A continued and slow rise of temperature for more than three or four days leads the physician to suspect that he may be dealing with an infection of the enteric group. Agglutination reaction seldom gives a positive result before the 10th day of the disease and therefore the only way of arriving at a proper diagnosis so early is by culturing the blood for typhoid group of organisms. If a positive diagnosis of typhoid is made by blood culture, treatment by Veno-Typho-Phage will yield encouraging results.

The principle of treatment may be briefly stated to be (a) the finding out of the minimum intravenous reactionary dose. (b) administering half the reactionary dose for three successive days.

It is usual to start by injecting intravenously ½ c.c. of Veno-Typho-Phage twice daily (morning and evening. On the second day two injections of 1 c.c. each (intravenous) are given morning and evening. This may produce slight chill or rigor but will probably cause no febrile reaction. The injections are repeated on the third day using 2 c.c. of the Phage

for each injection. This 2 c.c. dose usually causes a definite rise of temperature of about 2°F. and in that case is regarded as the reactionary dose. The reactionary rise of temperature may be due mainly to the lytic effect of the bacteriophage element on the bacteria and consequent liberation of endotoxin and partly to the action of the lysed products of bacteria already present in the phage.

There may be a sharp fall of the temperature after the reactionary rise which marks the onset of cure. The intravenous injections are continued for the next three days twice daily (morning and evening); the dose used being half the reactionary dose, *i.e.*, 1 c.c. It must be distinctly understood that the reactionary dose is not the same for all patients and the physician has to find out the reactionary dose in each individual case. Having once found the reactionary dose for the particular patient, the intravenous injections are to be continued for the next three days —using each time only half the reactionary dose.

*Treatment of advanced cases during the second week.*

The plan of treatment by intravenous typhoid phage is the same. As stool culture gradually gives increasing percentage of positive result and as a certain amount of localisation takes place in the intestine from the second week onward, it is preferable to use in addition oral typhoid phage to exert beneficial local action by destroying typhoid bacilli in the intestine.

*Treatment of late cases—Third week or later.*

The recommended plan for intravenous injection remains the same. In view of the fact that in almost all cases there is a secondary infection by the fæcal organisms, specially enterococci, B. coli, etc., oral administration of typhoid phage and entero phage along with intravenous injection is undoubtedly the best suggestion.

*Treatment of Toxæmic cases.*

In toxæmic cases, the starting dose must be ½ c.c. of 1 in 5 dilution, morning and evening, on the second day ½ c.c. of 1 in 2 dilutions, morning and evening and on the third ½ c.c. undiluted, followed by the usual doubling of the dose to find out the minimum reactionary dose. In these cases the patient must be prepared, before the intravenous injection, with stimulants and an injection of adrenalin and should be carefully watched for cardiac depression.

There may be doubts as to the usefulness of oral typhoid phage in view of the fact that it has to pass through the acid contents of the stomach. The following protocol will prove the typhoid phage kept for 3 hours in acid range (pH 3·0) and readjusted to the original pH(*i.e.*, pH8·2) loses practically little of its potency.

PROTOCOL No. 1.

The phage brought down to different pH ranging from 3 to 7, kept in the incubator for 3 hours and then readjusted to the original pH (8·2) showed the following lysis in different dilutions. Strain No. Ty. 487 was used in these experiments and 2 drops of different dilutions were added in each case after

| | | DILUTIONS OF SAMPLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Samples | Strain control | Undiluted | $10^{-1}$ | $10^{-2}$ | $10^{-3}$ | $10^{-4}$ | $10^{-5}$ | $10^{-6}$ | $10^{-7}$ | $10^{-8}$ |
| Flask 1 pH 3 | Growth | +++ | +++ | +++ | +++ | +++ | + | – | – | – |
| Flask 2 pH 4 | do. | +++ | +++ | ++ | ++ | ++ | ++ | ++ | + | – |
| Flask 3 pH 5 | do. | +++ | +++ | +++ | +++ | +++ | ++ | ++ | ++ | ++ |
| Flask 4 pH 6 | do. | +++ | +++ | ++ | ++ | – | – | – | – | – |
| Flask 5 pH 7 | do. | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | ++ |
| Flask 6 (unadjusted) pH 8·2 | do. | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | ++ |

3 hours' incubation and the result was noted after six hours.

In the above experiment, flask 1 contained phage pH of which was brought down to 3 and kept at pH 3 for 3 hours in the incubator, then pH readjusted to pH 8·2. The other flasks were similarly treated by bringing the pH down to different values, which are noted against each and then readjusted to pH 8·2 before titration.

In introducing the phage directly into circulation the question of adsorption of the phage by the blood comes in. That a certain amount of adsorption takes place is evident from a study of the following protocol.

PROTOCOL No. II

*The experiment was done with strain No. Ty. 487.*

| Description of the sample | Sample Control | Strain Control | Phage as it is | DILUTIONS OF THE SAMPLE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Undiluted | $10^{-1}$ | $10^{-2}$ | $10^{-3}$ | $10^{-4}$ | $10^{-5}$ | $10^{-6}$ | $10^{-7}$ | $10^{-8}$ |
| Phage 5 c.c. and cit. human blood 5 c.c. kept for 24 hours at 37°C. and then filtered. | No growth | growth | +++ | +++ | +++ | +++ | +++ | ++ | ++ | ++ | − | − |
| Phage 5 c.c. and normal saline 5 c.c. kept for 24 hours at 37°C. and then filtered (control). | do. | do. | +++ | +++ | +++ | +++ | +++ | +++ | +++ | + | + | ++ |
| Phage 2½ c.c. and citrated human blood 5 c.c. kept for 24 hours at 37°C. and then filtered. | do. | do. | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | + | − |
| Phage 2½ c.c. and normal saline 5 c.c. kept for 24 hours at 37°C. and then filtered (control). | do. | do. | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | ++ | − |
| Phage 1¼ c.c. citrated human blood 5 c.c. kept for 24 hours at 37°C. and then filtered. | do. | do. | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | − | − |
| Phage 1¼ c.c. and normal saline 5 c.c. kept for 24 hours at 37°C. and then filtered (control). | do. | do. | +++ | +++ | +++ | +++ | +++ | +++ | +++ | ++ | ++ | ++ |

Two drops of different dilutions were added in each case after 3 hours' incubation and the result was noted after 24 hours. Phage seems to be absorbed only in part by the blood in each case.

It is mainly with the idea of making allowance for the adsorption factor that we have recommended repetition of injections at intervals of 12 hours so that the action of the previous doses may be maintained uninterrupted. It is probably the same consideration which prompted McNeal and Frisbee to repeat intravenous staphylococcus phage injection at intervals of 2 to 3 hours in their series of cases.

## CASE REPORTS

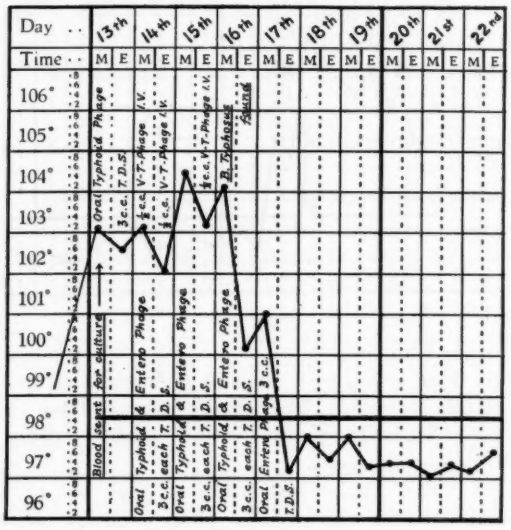
We have received up to now reports of only six cases of typhoid fever with positive blood culture treated by intravenous typhoid phage administrations. We have also received reports of ten cases of irregular fever (not definitely diagnosed by blood culture) treated by intravenous typhoid phage with good results.

## SUMMARY

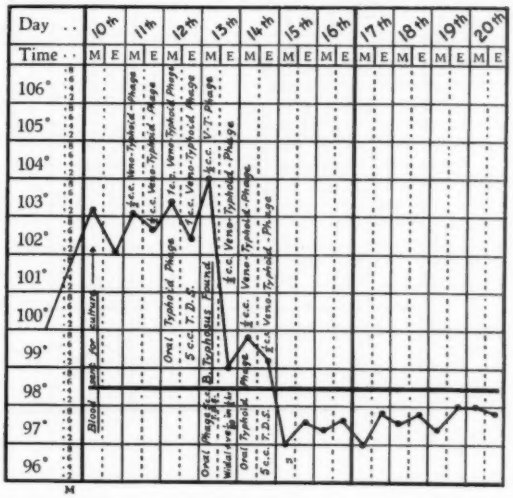
1. Coleman and Buxton in their study of blood culture in typhoid cases have definitely established septicæmic nature of typhoid fever in all stages of the disease.

2. It therefore appears to be rational to administer typhoid bacteriophage intravenously so

## *CASE RECORDS*




CASE I

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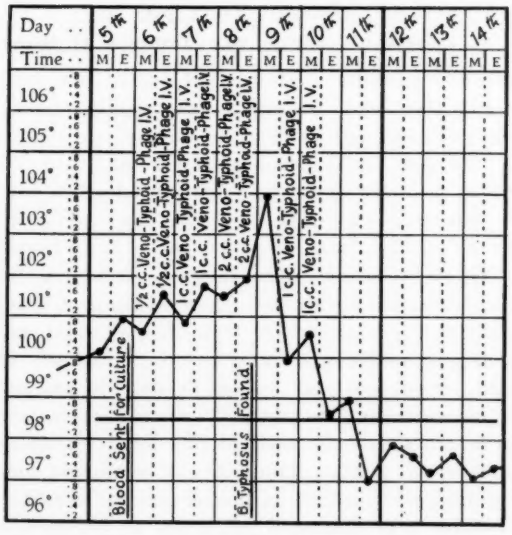
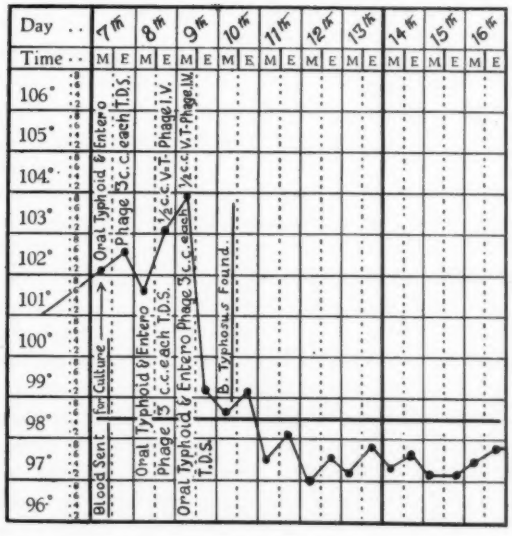
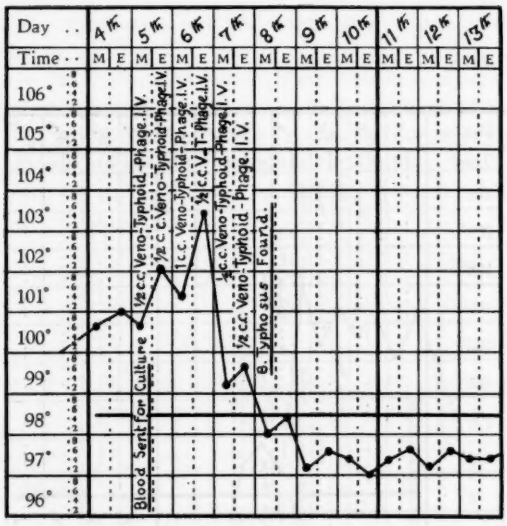


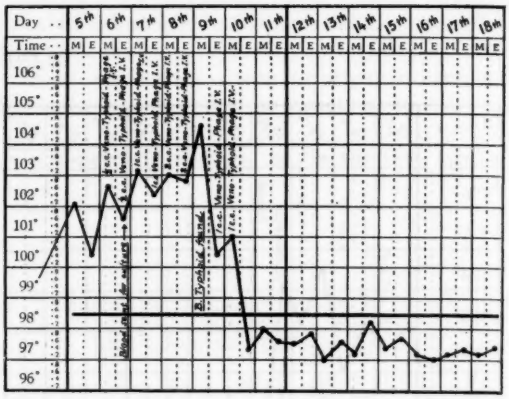

CASE II




CASE IV




CASE V




CASE VI

that it may exert its specific direct lytic effect on the bacteria circulating in the blood.

3. Oral bacteriophage therapy is likely to be more helpful during the later stage of the disease when there is a greater amount of localisation in the intestines as shown by experiments of Hiss, who obtained increasing positive results in stool culture as the disease advanced.

4. The above considerations lead us to the conclusion that intravenous phage therapy is the matter of choice in all stages of typhoid fever, supplemented by oral therapy, only in the later stages of the disease.

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# THE VALUE OF INTRAVENOUS GLUCOSE THERAPY IN CLINICAL PRACTICE

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It is only recently that the importance of glucose therapy especially through the intravenous route in the treatment of cardiac asthenia due to all causes has been receiving increasing recognition all over the world. Even before 1925 the injection by veins of 10% aqueous solution of commercial glucose was used in treatment of pneumonia with great benefit and without any accident all throughout the attack. To-day it is the most potent and useful of all the cardiac foods and tonic in emergent conditions against which very few scientific and logical objections could be put forward. Much ink and paper has been wasted in discussing the desirability or otherwise of administering alcohol, digitalis, strophanthin, strychnine, camphor in ether and a host of similar remedies in asthenic and toxæmic states and we all know how divergent most of the authorities are in their opinion as to the utility of these drugs but I am confident that no such division has happened or will happen with regard to this food tonic which is at once logical, appealing, simple, natural and efficient and to which the human body is more accustomed than to anything else of that nature. I have felt that to most of my brethren in moffusil areas the marvels of this drug have not been revealed and they still continue to have unwarranted faith in the class of drugs I have just mentioned to stimulate a failing and starved heart. But before we proceed to consider the use of this very useful sugar in various asthenic states it would be worth our while to recapitulate the importance in general of this substance to the body. All the carbohydrates which are taken in with the food are ultimately broken into the three monosaccharides, glucose, fructose and galactose in the alimentary canal and of these glucose is overwhelmingly predominant. Glycogen, which is a simple product of polymerisation of glucose, is stored in all vital organs of the body, especially that mysterious and complicated factory of the human body known as liver which guards the portals of the systemic circulation from the splanchnic area and scrutinises religiously and meticulously most of the undesirable products which happen to enter the body through the extensive absorbing surfaces of the intestines. Not only that, it takes the most active part in trying to make inert poisonous products entering through other channels though it is not always successful and not infrequently falls a martyr before the virulence of the poisons in the cause of the body it serves. An ample store of glycogen in the liver appears to supply that organ with sufficient strength to carry out this regime of detoxicating the toxic products with greater efficiency than would have been possible without it. It is thus more than an established fact that the body as a whole or taking its various organs individually, falls an easier victim to microbic or metabolic poisons when in a famished and starved state than when possessed of some food reserve and we also know that no food can more quickly be utilized by the body even when at its lowest ebb of activity than a food like glucose ready for utilization, introduced directly into the blood stream and obviating the unnecessary and uncertain process of absorption from the intestines. That is why glucose is considered to-day such an important member of the physician's armamentarium and is so admirably useful as a preventive or a curative means of the toxic states arising from treatment of patients with heavy metals like arsenic, mercury, bismuth and gold or when subjecting patients to chloroform anæsthesia just to mention a few of the commoner examples.

On account of the importance of glycogen as reserve material and because glucose is the immediate source of kinetic energy to all living cells, represented by warmth and movement of the body as well as by other physical changes involved in vital processes it is produced and stored up in all important organs to a variable extent. This glycogen is utilized as

glucose during muscular work and diminishes in amount with the activity of the muscles, striped or non-striped. Consumption of glucose can be very well demonstrated in an isolated contracting mammalian heart fed with Ringer's fluid or blood containing a small trace of glucose. A heart fed with blood and performing a normal amount of work may use about four milligrams sugar per gram of heart muscle per hour. We learn thereby to appreciate to some extent the significance of carbohydrates with special reference to glucose, the ultimate product before formation of carbon dioxide and water, both as sources of energy and as food for tissues. The average amount of glycogen in the different organs expressed as maximum and minimum per cent of the fresh tissues are given by Schonodorf as follows:—

| *Organs.* | *Maximum % of fresh tissue.* | *Minimum % of fresh tissue.* |
|---|---|---|
| Liver | 18·69 | 7·3 |
| Muscle | 3·72 | 0·72 |
| Heart | 1·32 | 0·104 |
| Bone | 1·90 | 0·197 |
| Intestines | 1·84 | 0·026 |
| Skin | 1·68 | 0·090 |
| Blood | 0·0066 | 0·0016 |

Again a certain amount of carbohydrate is necessary condition for both fat and protein metabolism. Carbohydrate administration has a sparing effect on proteins. And there is no lack of evidence to show that carbohydrates play an important part in the metabolic history of fats. In their absence the last stages in oxidation of fats make default so that the partially oxidised fatty acids—oxybutyric acid and aceto-acetic acids accumulate in large quantities and are excreted as such or as acetone in the urine. If the condition of carbohydrate starvation be continued the mechanism of defensive neutralisation of these toxic bodies is paralysed and the phenomenon of acidosis supervenes resulting in death. This is one of the conditions in which intravenous glucose along with insulin saves the life of the patient. Another unfortunate result of carbohydrate starvation is the condition of fat infiltration in which the liver takes the most important part.

Thus looking carefully into these facts we find that nature has made ample provision for constant supply of sugar in the form of glucose, it being so essential to nutrition, integrity and vitality of all tissues. The very facts that during prolonged carbohydrate starvation even protein and fats are converted into glucose and that secondly an almost constant level of it is always maintained in the blood through the agency of the liver is ample testimony to the extreme necessity of this important sugar to the living organism. One is often struck with wonder when occasionally glucose even in smaller quantities of 40 to 50 c.c. of a 20% solution introduced through the veins appears to infuse life and strength into the delicately balanced machineries of the heart and kidneys when their attempt to function appears to be flickering due to the paralysing effects of toxic products of microbic or metabolic origin circulating in the blood stream.

Having now thus briefly visualised the role of glucose in physiological and pathological states I shall now endeavour to relate its uses in some of the commoner clinical conditions.

In the treatment of severer forms of enteric group of fevers we are up against a very intense form of toxæmia and if we follow as most of us still do, the conservative school of thought with regard to feeding of the patients in these infections there is also a prolonged condition of starvation. As a result of these two factors all the important organs including kidneys, liver and most notably the heart undergo a slow degeneration. To remedy this state of affairs, daily injections of intervenous glucose is of immense value. By this not only we give food to all tissues (including the heart the most important organ to protect) without taxing the intestines which are ulcerated or the digestive powers which are so low but we are also able to dilute the toxins to some extent; we spare the fats and proteins of the body and thus lessen emaciation as far as possible. Attention to these facts during the earlier part of the disease lessens the chances to a considerable extent of our having to whip a starved and heavily poisoned heart at the close of the scene with strychnine and digitalin usually to witness it drop dead—an unfortunate spectacle which is the sad experience of almost every practitioner in our ranks. To feed or water it at that moment is also seldom of any avail. By advocating intravenous glucose, I certainly do not mean that it should not be given by mouth. But what I wish to emphasise is that through the intravenous route it can be given more quickly and is

much more suitable for urgent conditions. We are sure about the quantity and its availability to the tissues, there is no difficulty of absorption, no fermentation in the intestines, no taxation to the absorbing surfaces. Glucose by mouth is not in favour with most of the modern physicians in this particular group of fevers because it is easily fermentable by the enteric group of bacilli. Lactose is given in preference as the bacilli are supposed to be non-lactose fermenters. It is not possible to assert how far this is clinically true. By giving glucose intravenously, however, we even escape this criticism. Of course, it should only be considered an important adjunct to the general accepted regime of treatment.

Another group of fevers in which this sugar seldom fails to show its marvels is the group of pneumonias—notably the lobar pneumonia. Here starvation is not prolonged but the toxæmia is acuter. Heart is more quickly poisoned and it is the prevention of failure of this organ that forms the physician's most important concern. Daily intravenous glucose in quantities of even 25 c.c. solution lowers the mortality by keeping the heart well-fed, as well as diluting the toxins, which latter condition facilitates their excretion through the usual channels.

In the treatment of uræmic conditions, intravenous glucose sometimes appears mysteriously to do immense good to the patients by encouraging the urinary excretion. As I have mentioned above this can be only explained, in our present knowledge of its action, by diluting the toxins and stimulating the tissues to action by supplying them with an easily assimilable food. The detoxicating power of the liver and probably also kidneys is enhanced by glucose.

In the treatment of shock and collapse intravenous glucose with or without saline as the case may require, in addition to other usual methods is of recognised value.

Toxæmias of pregnancy, especially the icterus gravidarum and neurotic vomiting form other groups of maladies where glucose is most generally useful when administered intravenously though it is also given per rectum.

In puerperal septicæmia and antepartum hæmorrhage due to toxæmia it is equally important and efficacious. Poisoning by arseno-benzol compounds, mercury, bismuth, gold, chloroform. T. N. T., carbon-tetrachloride and others are very profitably treated with intravenous glucose which may be combined with sodium thiosulphate and calcium gluconate. In fact, it is wise to feed patients with glucose before giving arsenic by intravenous route or subjecting them to chloroform anæsthesia or administering even carbon tetrachloride.

In diabetic coma intravenous glucose with insulin and alkalies has already been mentioned.

In the treatment of malignant malaria, especially with coma, glucose with quinine intravenous is safer than quinine alone. It combats the toxæmia and saves the heart from the deleterious effects of quinine suddenly, though profitably introduced into the blood stream.

In cases of intense anæmia, due to protozoal or helminthic infections, in impoverished states of blood in terminal states of K. A. and chronic dysentery, there is no food or drug superior to glucose to sustain the patients. In the treatment of severe ankylostomiasis with blotting paper tongue, marked œdema of the extremities, abdomen and face, degeneration of the heart, liver and the intestines with other concomittant symptoms a condition which is so common in these parts we cannot do better than proceed the usual treatment with anthelmintics by intravenous glucose for a reasonable time.

It can be asserted that there will hardly be an occasion for us to be sorry if we requisition the help of this most useful food and drug in all forms of severe bacterial and metabolic toxæmias in general and in gravely asthenic conditions of the heart resulting from prolonged starvation and even in cases of heart failure following primary organic diseases of that organ.

The scope of its use is very wide, almost universal if we include the oral and rectal methods of administration. It remains for as to realise and profit by this knowledge. As I have already apologised there is nothing new that I have stated. I have simply emphasised its salient features and have advanced a sincere plea for its more liberal and sensible use.

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## CLINICAL ELECTROCARDIOGRAPHY

The practising physician of to-day is enabled, by the help of various instruments of precision, to work with a degree of satisfaction and success totally unknown to his predecessors, even a quarter of a century ago. Pride of place will readily be conceded to the string galvanometer, which has made rich and increasingly exact contributions to the art and science of clinical medicine. Disorders of rhythm were but imperfectly understood at the beginning of this century and their elucidation and classification in simple terms applicable at the bedside is one of the many merits of this wonderful instrument. More recently, the mystery-symptom, precordial distress, has been classified into two main groups—coronary disease and the other group where coronaries are not affected. Further, the structural condition of the myocardium, its tone and contractility, the relative hypertrophy of one or other chambers of the heart, the size and position of the heart in the thoracic case, all these are far more clearly understood these days. Syncope whether primarily cardiac, or vascular, or entirely neuronic in origin is capable of being differentiated.

The attention of our readers, specially those who are engaged in general medical practice, is drawn to a valuable contribution, published elsewhere in this journal, by Doctors Basu and Ghosh, entitled, "The Theory and Interpretations of Electrocardiograms." At the outset, the authors frankly admit that they do not propose "to present anything new in this paper," but have attempted to put forth the essential features in an easily intelligible form. Text-books on this subject are so numerous and often so expensive that it is not easy for every practising general physician to invest his hard-earned money in them: and yet it behoves him to acquire a sound knowledge of the principles of the subject without the sacrifice of much time or money. Doctors Basu and Ghosh have been pre-eminently successful in attaining their object. The last two pages of the article are specially illuminating and set forth in tabular form, the more common aberrations met with in the standard curves and the clinical interpretation of each abnormal tracing.

It is quite a debatable point as to what extent a physician in general practice is capable of interesting himself in a branch of specialized medicine. With the passing of years, the number of "ologies" is on the increase, and the amount of newer knowledge of each speciality increases by leaps and bounds, whereas the time and opportunity for each specialized study gets more and more restricted. Generally speaking, we find that among the leading general physicians in Western countries, and among the university professors of general medicine, there are many who are also very highly skilled in one or other

branch, for instance, alimentary or respiratory diseases, cardiology or childrens' diseases; or they are keen on tropical ailments, or infective febrile maladies. For instance, the Regius Professor of medicine at Oxford is the reputed neurologist, Sir Farquhar Buzzard; his colleague at Cambridge is Sir Langdon Brown, renowned in metabolic and renal diseases. It is, therefore, apparent that the specialized study of one branch of medicine is well suited to, and fits well into the practice and teaching of medicine as a whole. One of us had questioned Doctor James Collier, the London neurologist, as to what periodicals on neurology are worth studying: to this, he answered that even he found it difficult to keep abreast of the leading advances in his special subject, which means that the task is well-nigh hopeless for a general physician who has to teach and practise in all general diseases.

The chief merit in the article is the limited range of newer knowledge sought to be imparted. The selection is admirable, the article is "pruned" effectively, nothing is superfluous or redundant.

There is no apprehension that the physician who attempts to master its valuable contents will have to forget other items of medical news, assuming that the average brain-capacity is a finite quantity and not elastic. Within the limits of space, it would not be possible to improve upon this contribution as regards wealth of contents: nevertheless, there is one thing that the general practitioner would like to ask for: he would like to be told, more or less precisely, what are the bedside findings in cardiac practice which more urgently demand and deserve the help of electrocardiography. Auricular fibrillation in its more usual manifestations is easily recognizable at the bedside: but not so easy is a complete intermission of one or more beats of the heart: this may be either a parltial A-V heart block, or a sino-auricular block, or even a very rare type of very weak premature contractions of the ventricles. This last physical sign, *viz.*, intermittent heart beat is one among many more that needs instrumental aid. The more correctly and more frequently the bedside physician can estimate the need, and call for the help of the string galvanometer, the greater will be the precision in diagnosis. Correct therapeutic aid and a well-balanced prognosis will then follow as surely as night follows day.

# CASE NOTE

## CHRONIC LEUKÆMIC MYELOSIS

A. C. BOSE, M.B.

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It was in 1845 that Hughes Bennett of Edinburgh first noticed a disease characterised by persistent increase of "white cells" and regarded it as "pyæmia"—this view was not accepted by Rudolf Virchow who recorded a similar case and called it as "white blood". The latter was later on supported by Bennett. Virchow preferred for the disease the name "Leukæmia" to "Leucocythæmia" given by Bennett.

Virchow's original classification of "Splenomedullary and Lymphatic Leukæmia" was later on modified as "Myeloid Leukæmia" or "Myelæmia" and "Lymphatic Leukæmia" or "Lymphæmia." The recent terminology as "Myelosis" and "Lymphadenosis" are based on actual pathological changes in the hæmatopoietic tissues. These may be either leukæmic or aleukæmic, and may run an acute or a chronic course.

The ætiology is still unknown. Heredity, sex, nationality and place play no part in the disease. Several theories put forward by different hæmatologists (*viz.*, that these are due to infection or toxin or are of the nature of true neoplasms) have not been proved.

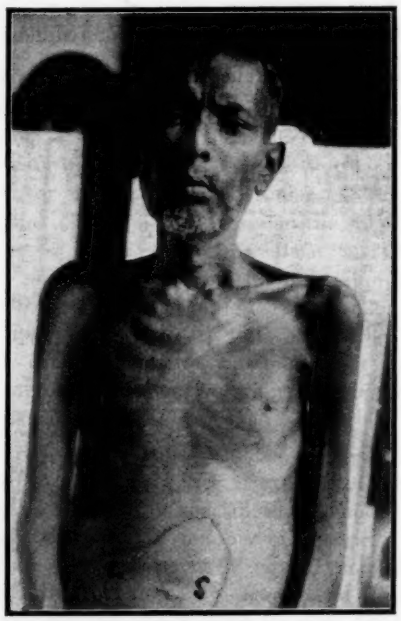
The following case is described with complete blood picture.

A. C. De Sircar, H.M., 58, was sent to the pathological laboratory from the out-patients department, Mayo Hospital, for investigation.

About a year back the patient started intermittent rise of temperature (ranging from 100° to 101°) with loss of appetite, constipation, weakness, and fetid smell in the mouth. He also noticed gradual enlargement of liver and spleen. Injections of emetine and Urea Stibamine in small doses were given, the latter when given in high doses was attended with reaction. This treatment failed to show any improvement. Then under Kaviraji treatment he had complete remission of temperature with some diminution in the size of the liver and spleen.

Six months later he started fever again and came to Calcutta for treatment with fever (99° to 101°), œdema of legs, and extreme weakness.

On examination the liver was found enlarged 1 inch below costal margin and spleen formed a hard smooth tumour reaching below the umbilicus. No enlargement of superficial glands was noticed. Lungs and heart were found free from any involvement. There was no jaundice. Gums were extreinely spongy and there was pyorrhœa alveolaris.



Patient showing pale appearance and enlargement of liver and spleen

Urine on examination showed the presence of albumen only but no casts.

The blood-picture was as follows:—

| | |
|---|---|
| Total leucocyte count | 1,48,000 per c.mm. |
| Total erythrocyte count | 1,890,000 per c.mm. |
| Hæmoglobin (Sahli's method) | 35% |
| Cell volume (Daland's hæmatocrit) | 25% |
| Colour index | 0·9 |
| Volume index | 0·7 |
| Saturation index | 1·4 |
| Differential leucocyte count: | |
| Polymorphonuclear neutrophils | 50% |
| Lymphocytes | 10% |
| Monocytes | 1% |
| Polymorphonuclear eosinophils | 1% |
| Myelocytes (mostly neutrophilic types) | 38% |
| Halometric index 4:9 (size of red cell 7·4 $\mu$) | 4·9 |
| Reticulocyte count | 3·5% |
| Fragility of red cells | 0·2% |
| Bleeding time | ½ min. |
| Coagulation time | 2 min. |
| Formaldehyde reaction | negative |
| Chopra's test | negative |
| Malarial parasites | not found in thin and thick films. |
| Kahn's test | negative |

The patient was recommended X-ray treatment.

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# CURRENT MEDICAL LITERATURE

## MEDICINE

### Chronic Non-Leukæmic Myelosis

Hickling (*Quarterly Journal of Medicine*, July, 1937, page 253) reviews the literature on the subject and reports on 7 cases personally observed by him, the characteristic features of which were (1) a chronic course (varying from eighteen months to thirteen and a half years), (2) progressive splenic enlargement reaching a great size and enlargement of the liver, (3) absence of enlargement of the lymphatic glands and (4) constant presence in the blood of immature myeloid cells along with nucleated red cells even in absence of anæmia without the great increase in total number of leucocytes. W. R. was negative in all the cases and there was in none any family history of splenic enlargement, jaundice or anæmia. Sclerotic changes in the bone marrow with new bone formation in the marrow cavity of the bone, the presence of giant cells along with myeloid metaplasia, high blood bilirubin and high blood uric acid contents are also some of the striking features of chronic non-leukæmic myelosis and are more common in this type of cases than in the leukæmic type. Splenectomy was not only a failure but also attended with danger.

### Heart In Severe Anæmia

Tung and Associates (*Chinese Medical Journal*, October, 1937, page 479) report on their study of the cardio-vascular system in 10 patients suffering from severe anæmia (hæmoglobin 2·5 gm. or 17%). This study included the clinical, radiological and electrocardiographical examinations and determinations of circulation time and venous pressure and these patients had no recognisable factor causing heart disease. The authors observe that 3 of them had marked cardiac enlargement with little or no evidence of congestive failure, 6 had marked enlargement with pronounced congestive failure and one had normal heart. They further note that all of them except one had sinus tachycardia and large pulse pressure. The enlargement disappeared with rest and increase of the hæmoglobin and the heart became normal in size and shape when the blood became normal. They conclude by saying that "anæmia heart" should be taken as a definite clinical entity.

### Diagnostic Criteria Of Angina Pectoris

Riseman and Brown (*American Heart Journal*, September, 1937, page 331) report on the analysis

of signs and symptoms of 207 patients suspected of having angina pectoris, obtained by the clinical history, physical examination, electrocardiographic tracings, teleroentgenograms of the heart, the basal metabolic rate, the blood serum cholesterol and the exercise tolerance test. They observe from such an analysis that the five characteristics of importance in diagnosis of angina pectoris are that the attacks are (1) sudden in onset, (2) short in duration, (3) involves the anterior part of the chest and inner aspect of the arms, (4) are induced by exertion in the cold and (5) consists of a vague indescribable sensation of unrest or distress. They further note that patients who lack one or more of these characteristics either have no cardiac trouble as the cause of the symptoms or have angina pectoris plus some complicating disease. Of the proved cases of angina pectoris 26% showed no abnormality in the electrocardiogram, blood pressure or size of the heart as determined by X-ray examination. Difficulty in diagnosis occurs in non-cardiac cases simulating angina pectoris or in angina pectoris cases simulating or occurring along with noncardiac diseases. Detailed clinical history and exercise tolerance test will establish the ultimate diagnosis.

### Gonococcic Arthritis: Pathogenesis And Treatment

Keefer and Spink (*Journal of American Medical Association*, Oct. 30, 1937, page 1448) in reviewing 140 cases of gonococcic arthritis observe that gonorrhœa is the frequent cause of polyarthritis, may affect any joint but most commonly affects knees, wrists and ankles. The pathologic lesion start in the periarticular tissue and synovial membrane, cartilage being involved secondarily. Destruction of cartilage is most conspicuous in the wrist, hip and finger joints, fibrous ankylosis is more common and bony ankylosis is rare except in the wrist joints. Diagnosis rests on (1) history of attack of gonorrhœa, (2) evidence of localised gonococcic infection of the genital tract, (3) a positive reaction to the gonococcus complement fixation test on the blood and/or synovial fluid and (4) the demonstration of gonococci in the synovial fluid. The main principle of treatment is to remove the cause, give relief from symptom and restore normal function to the joints. Specific serum therapy is restricted to cases of bacteriæmia and is on the whole a failure. The fever therapy is more effective. There has been a revival of chemotherapy in the treatment of gonococcus infection and the authors' experience with sulphanilamide in 3 cases of arthritis causing sterilization of the synovial fluid in 3 or 4 days' time suggests further trial of the drug in this condition. All joints showing an increase of fluid should be aspirated. When the fluid is infected or contains large amount of mucin and fibrin the joint is opened and after thorough irrigation closed tightly and placed in traction. Patients with sterile synovial fluid have better prognosis than those with infected fluid and patients whose hip and wrist joints are affected do not recover so completely as those who have only the knee-joint involved.

### The Fate Of Large Dose Of Iron Administered By Mouth

Brock and Hunter (*Quarterly Journal of Medicine*, October, 1937, page 5) write that it would be obviously fallacious to draw comparison between cases in so small a series but the result suggests that (a) the size of the dose affects the amount retained, (b) there is a tendency to higher rates of retention in anæmic cases—every case with a retention greater than 10% is in the anæmic group, (c) that the ferrous preparations are better retained than the scale preparations is not the universal rule—Whipple and Robscheit-Robbins were unable to find any difference in retentions of ferrous and scale preparations by dogs. Conclusions are: (1) the retention of orally administered iron has been studied in 10 balance experiments in 9 cases, (2) when large doses of iron and ammonium citrate or Blaud's pill are used, large quantity of iron are retained, (3) the retention of iron is much greater than has been inferred from the rate of hæmoglobin response. (Author's Summary).

### Blood Transfusion In The Treatment Of Black Water Fever

Blackie (*Lancet*, November 13, 1937, page 1124) from the Pasteur Institute, Salisbury (Southern Rhodesia) reports on the very successful results obtained by blood transfusion in black water fever. His cases are grouped under 3 heads, *viz.*, (1) mild type, (2) toxic type either polyuric or anuric and (3) relapsing type. The author observes that blood

transfusion is indicated in toxic polyuric and relapsing types of cases and in post blackwater asthenia and it is contraindicated in toxic anuric type. To be effective the transfusion should be started early in the disease and must be repeated. These observations are based on 50 cases of which 22 are reported in detail and of the 22 cases reported 3 died and they are of toxic anuric type.

### Treatment Of Syphilitic Heart Disease

Bourne (*Practitioner*, May, 1937, page 558) observes that syphilis forms 5 to 7% of cases of cardiovascular disease and the usual interval between the primary infection and cardiovascular manifestations is 10 to 12 years but may be 2 to 3 years. The important lesions produced in the heart are (1) aortic regurgitation, (2) occlusion of the mouths of coronary artery without thrombosis causing angina of effort. Aortic regurgitation may be thought to be due to syphilis if it occurs in a patient aged between 35 and 55 who gives no history of rheumatism and shows no sign of mitral diseases or hyperpiesia. When angina of effort is caused by syphilis the B. P. is usually normal and the heart is not enlarged, pain in the chest has no relation to exercise and may vary with posture. Aorta is dilated, aortic second sound is accentuated and W. R. positive between 75 to 85% of cases only. The treatment must be complete, *i.e.*, until W. R. is negative. Two or three courses every year may be necessary for 2 or 3 years. The treatment should begin with iodide, mercury and bismuth and when well-tolerated be followed by intravenous arsenic. Pot. iodide in grains fifteen and liq. hydrarg. perchlor. in drachm doses is given daily. Iodide is increased every 3 or 4 days by 10 to 15 grs. until the patient gets 180 grains a day. After 6 weeks, 12 bismuth injections of 1 c.c. each are given at weekly intervals. After that arsenic is given intravenously in 0·15 gms. doses and the dose should be cautiously increased to 0·3 gm. The total dose is 3·5 gm. In congestive failure digitalis is useful and when œdema is present Salyrgen at intervals of 5 days may be used with advantage.

### The Nature And Treatment Of Acute Glomerular Nephritis

Kellett (*Practitioner*, November, 1937, page 597) from his personal observations and from those of other workers writes that there is strong evidence that the mechanism underlying the production of acute glomerular nephritis is one of reversed anaphylaxis. If this hypothesis is correct it will ultimately be possible to recognise the onset of this type of response and prevent its occurrence by specific desensitization, until then the treatment should be symptomatic. As soon as the case is diagnosed he is put to bed-rest and kept warm. Tepid sponging or warm bath may be used with benefit but not the hot air baths or other methods of making the patients perspire. Local application of heat to the kidneys including the diathermy should be restricted to cases of extreme anuria. Diuretics should not be used and the bowels be kept open with mild laxatives or mineral salts avoiding mercurial preparations. For the first three days the diet should consist of carbohydrate only and be restricted to a pint of bland fluid such as orangeade, weak tea with sugar or glucose along with the juice of an orange. Milk for its high protein and chloride contents should better be withheld or be used very sparingly. After 3 days the fluid intake is increased gradually being governed by the total urinary output and other starchy and fatty foods be added. Later on protein should be added to the diet and be restricted to 50 gms. daily during the time he is in bed. For such emergencies as left heart failure in cases with hypertension, venesection (600 c.c. of blood) and absolute rest in bed with restriction of fluids are quite effective. In cases with signs of cerebral œdema venesection followed by lumbar puncture and morphine or other sedatives are necessary. If convulsions recur inhalation of chloroform or intravenous administration of 1% solution of magnesium sulphate (in children 10 c.c. per kilo at rate of 2 c.c. a minute) or a hypertonic glucose solution (100 c.c. of 50% solution) should be used. This will usually tide over the acute stage. The patient is kept in bed till his blood pressure comes down to normal and the urine becomes free from albumen and formed elements. If in any case the albuminuria persists even after two months' rest and his kidney function is deficient and blood urea high, he should be carefully watched and protected from cold, fresh infection and further similar attacks. Septic foci present must be eradicated and measures for improving the general health be adopted.

## SURGERY

### The Effect Of Flight On The Middle Ear

Armstrong and Heim (*Journal of American Medical Association*, August 7, 1937, page 417) write that a traumatic inflammation of the middle ear is caused by a pressure difference between the air in the tympanic cavity and the surrounding atmosphere, occurring during altitude changes in aeroplane flights. In acute cases a passive hyperæmia from negative pressure or an ischæmia from positive pressure develops and on relief of the pressure a period of active hyperæmia follows. The mucous membrane becomes congested and swollen, the eustachian tube gets blocked and the tympanic cavity closed. The epidermal layer of the tympanic membrane is also inflamed and may rupture. Chronic aero-otitis media is the result of repeated attacks of inflammation when the tympanic membrane, the mucous membrane of the middle ear and of the eustachian tube get chronically inflamed. This aero-otitis media is a definite clinical entity and characterized by inflammation, pain, tinnitus and deafness.

### Recurrent Inguinal Hernia

Fallis (*Annals of Surgery*, September, 1937, page 363) in reviewing 200 cases of operations for recurrent hernia in the Henry Ford Hospital in Detroit reports that there were 26 operative failures (13%), that 78% of the recurrences occurred in patients from 30 to 50 years, that 92% of them did heavy labour, that 75% of the recurrences appeared more than 6 months after the operation. According to the author the technical error at the primary operation, *viz.*, the failure to obtain a high ligation of the sac in indirect hernia and failure to repair the rupture of the transversalis fascia in direct hernia is the principal cause of recurrence. The essentials for success in hernia operations will thus be high ligation of the sac, attention to the transversalis fascia and suturing of all structures without being overstretched.

### Indications And Contra-indications To Splenectomy

Uphan (*Southern Journal*, Atlanta, Oct., 1937, page 385) reviews the work on splenectomy, of Dean, Wiseman and Curtis in the Clinic of the College of Medicine of the Ohio State University. There were thirty-one splenectomies, seventeen of which were hæmolytic icterus, without a single fatality although six patients were in acute crisis and two had less than 2 gm. of hæmoglobin and appeared practically moribund when taken to the operating room. There also were four cases of Banti's disease, three of thrombopenic purpura, three of hypoplastic anæmia and one each of lymphatic leukæmia, polycythæmia vera, myeloid leukæmia, and leukæmia. The conclusions are: 1. The pathologic physiology of the spleen may be manifest through either or both of two mechanisms: inhibitory and destruction—and may affect any or all of the circulating blood elements. 2. The spleen is the major pathologic agent in congenital hæmolytic jaundice. 3. Splenectomy is indicated as a prophylactic measure against clinical exacerbations of excessive hæmolytic activity in chronic and subacute manifestation of the disease. 4. Splenectomy is the therapeutic procedure in acute hæmoclastic crises. 5. The immediacy of the erythrocyte response following splenectomy in hæmolytic jaundice is dramatic occurring on the operating table. This autotransfusion removes the necessity of pre-operative or post-operative transfusions. 6. Splenectomy is not contra-indicated in properly selected cases of thrombopenic purpura in acute crisis, provided adequate preoperative blood transfusions are given. 7. In Banti's disease early splenectomy offers some hope of prolonging life. 8. In hypoplastic anæmia theoretically splenectomy should be of value. 9. In lymphatic leukæmia splenectomy may prolong life but cannot be considered curative. 10. The operation is contra-indicated in myeloid leukæmia and polycythæmia vera. (*Current Medical Literature, Journal of American Medical Association*, November 20, 1937, page 1761).

### Elimination Of Intestinal Gas Shadows In Rœntgenography: Preliminary Report Of 1000 Cases

Kennings and Lofstorm (*American Journal of Rœntgenology*, 37, 1937, page 28) report favourably on the action of Pitressin in eliminating gas shadows in rœntgenography done in 1000 patients. The technique is as follows: no cathartics are used, a cleansing enema is given on the night before and another in the following morning about 1½ hours before rœntgenography. 0·5 c.c. of Pitressin is injected intra-

muscularly ½ hour after and repeated another ½ hour later. The optimum effect of eliminating gas occurs about 30 to 40 minutes after injection and gas shadows reappear 2 to 3 hours after. The authors observe that Pitressin does not totally eliminate the gas but minimises it to such extent as to obtain clear films. Contra-indications are heart disease, acute complete mechanical intestinal obstruction of long standing and pregnancy of more than six months duration. Slight and transient symptoms noted after injection can be minimised by giving water orally in sufficient quantity.

## OBSTETRICS AND GYNÆCOLOGY

### The Endocrine Background Of The Toxæmias Of Late Pregnancy

Shute (*Surgery, Gynæcology and Obstetrics*, October, 1937, page 480) writes that from endocrine point of view the late toxæmias of pregnancy can be grouped under two heads, *viz.*, eclampsia and retro-placental hæmatomas or abruptio placentæ. In eclampsia there is high prolan excretion, high blood thyroid and low blood cholin whereas in the abruptio group the blood has high œstrin, low thyroid and high cholin values. Moreover, wheat germ oil has been found in the abruptio group—a prophylactic and therapeutic agent of great value and there is strong reason to believe that œstrin therapy will be of some help in the eclamptic type.

## PATHOLOGY AND BACTERIOLOGY

### Studies In Grave's Disease: Alterations In Gastric Secretion And Correlated Blood Changes

Louis and Wills (*Quarterly Journal of Medicine*, October 1937, page 353) report that there occurs in certain cases of thyrotoxicosis achlorhydria or hypochlorhydria and also a marked reduction in the total volume of gastric juice. They further point out that there is recovery of the gastric function within ten days of thyroidectomy, septic complications only delaying the return of acid. Plasma and whole blood chlorides are in the lower ranges of the normal in thyrotoxicosis and operation causes a further fall of the values.

### Tryptophan Reaction In Meningeal Tuberculosis

Baxter (*Edinburgh Medical Journal*, October, 1937, page 663) reports that the tryptophan test is a very reliable aid in the diagnosis of meningeal tuberculosis. Tryptophan solution is added to cerebro-spinal fluid obtained after lumbar puncture and centrifugalisation and when the test is positive a delicate violet ring is produced at the junction of the fluids but it is negative when there is either no ring or only a brown ring. The test was found positive in 41 cases of meningeal tuberculosis and was negative in all but one of the 32 control cases. The test is very sensitive and quite helpful even in very early cases as is evidenced from the report of 7 cases given by the author, *viz.*, that it proved positive in 2 cases on the 2nd day, in 3 on the 3rd day and in 2 on the 4th day.

### Examination Of The Bone-Marrow By Sternal Puncture

Zanaty (*Lancet*, October 23, 1937, page 958) writes that marrow examination by sternal puncture is of great value in the study of morbid anatomy and physiology of the blood forming organs and the effects of treatment. By comparison of blood and marrow pictures one can have a better understanding of the etiology and consequently a rational treatment can be chalked out. The puncture is simple and the technique is as follows: A special short hard steel needle fixed to a movable shield which again is fixed at 0·5—1·5 cm. from the point of the needle in accordance with the bulk of the patient is inserted carefully on the middle of the sternum (previously anæsthetised with novocaine) at the level of the 3rd costal space. The stilette is then removed and by means of a 2 c.c. syringe about 0·2 c.c. of blood is aspirated. Films are prepared and stained by the May-Grunwald-Giemsa method. The remainder is oxalated and the total cell count determined. The wound is sealed up with collodion.

## PEDIATRICS

### Dietetic Treatment Of Eczema In Infants And In Children

Finkelstein (*American Journal of Diseases of Children*, August, 1937, page 345) in reviewing the subject observes that infantile eczema is of two main

types, seborrhœic and 'true' eczema. Seborrhœic eczema is a primary disturbance of the protein and fat metabolism in the skin, resulting in dyskeratosis with secondary inflammation whereas 'true' eczema is a primary exudative inflammation with secondary dyskeratosis. Differential diagnosis mainly rests on localisation of eruptions. Seborrhœic variety has a predilection for (a) regions exposed to maceration, *e.g.*, folds of the skins and articular creases, (b) hirsute regions where there is increased secretion of cutaneous fat, *e.g.*, head, eyelids. In 'true' eczema folds are not affected and external irritation is not maceration or decomposition of fat but persistent rubbing of clothes (in the outer region of limbs). For treatment of seborrhœic eczema the diet should contain more protein, less fat and sufficient vitamin $B_2$. The addition of butter milk or skimmed milk will serve the purpose. There must be in addition the clearing up of any focus of infection, febrile complication or diarrhœa and a progressive gain in the weight of the patient by high carbohydrate diet. The 'true' eczema has the striking features of exudation and angioneurotic prurigenous syndrome leading to allergy, eosinophilia and itching. The diet therefore should contain less milk, less sodium chloride and enough of vegetables. A fruit-vegetables-carbohydrate diet, free from fat with 10 to 20 gms. of vegetable protein and no salt will quickly clear up the eczematous condition. The author maintains that the external treatment is often indispensable even when the diet is correct.

### Ascorbic Acid In Whooping Cough

Ormerod and Unkauf (*Canadian Medical Association Journal*, August, 1937, page 134) from observations of several investigators that ascorbic acid possesses a definite detoxicating effect on bacterial toxin used successfully vitamin C in the form of ascorbic acid in a series of cases of whooping cough. The cough was relieved, the paroxysms lessened and the disease was cut short from "a matter of weeks to a matter of days." The dose used was 500 mg. daily for 3 to 4 days followed by 250 mg. daily till the cough was relieved (generally 4 to 5 days).

### Hormone Treatment Of Cryptorchidism

Hes and Kunstadter (*Journal of Pediatrics*, Sept., 1937, page 324) in reviewing the results obtained in 39 cases of cryptorchidism by hypodermic injections of gonadotropic substance from the urine of pregnant women or from the placenta observes that there was complete descent in 28 cases, partial descent in 4 and no descent in 7. The total dose in successful cases varied between 2,500 to 3,500 rat units. The authors conclude by saying that the endocrine therapy should be tried in all cases of cryptorchidism before any surgical treatment is resorted to.

### Two Cases Of Pyloric Stenosis Treated With Eumydrine

Dobbs (*Proceedings of the Royal Society of Medicine*, August, 1937, page 1193) reports 2 cases, one 3 weeks old and another five weeks old suffering from pyloric stenosis treated successfully with eumydrine. 25 minims of a 1 in 10,000 solution of eumydrine are given twenty minutes before each feed and subsequently the dose is reduced to 15 minims. This treatment soon stops the vomiting and if the child can be kept alive for ten to twelve weeks by such a treatment an apparent spontaneous cure will result. Efficient replacement of both water and chlorides as indicated by satisfactory diuresis is absolutely necessary before eumydrine is used if toxic symptoms are to be avoided.

### Deafness: Prevention *versus* Palliation

Tumarkin (*Lancet*, Oct. 2, 1937, page 782) writes that investigation for sinus trouble should be made in any case of chronic otorrhœa persisting beyond 3 weeks. In cleansing the auditory canal he mentions the following points to be strictly observed: (1) there should be strict asepsis, (2) the external portion of the canal must be kept dry by applying mild mercurial ointment on the pinna, (3) swabs should not be forced down the ear, (4) the canal not being straight the forceps must not be pushed too far, the wool, however, can be manipulated on the forceps and can be pushed right down the canal, (5) cleansing should be finished off with spirit to wash away residual pus, to sterilize the meatus and help shrinkage of the swollen drum. Zinc ionisation is highly contra-indicated in acute and subacute otitis media though it is of great value in chronic variety. Catarrhal otitis media should never be neglected in children as it is the cause of much deafness. Removal of tonsils and adenoids is unnecessary and useless and the sinus infection must be treated.

# ASSOCIATION NOTES

*Minutes or proceedings of Branches and Affiliated Societies intended for publication should be sent to the Secretary of the I. M. A. at the Headquarters, 67, Dharamtala Street, Calcutta*—EDITOR.

## RAMNAD DISTRICT MEDICAL ASSOCIATION

The combined meeting of three Associations—the Ramnad District Medical Association, the Tinnevelly District Medical Association and the Madura Medical Association was held at the Sourashtra High School, Madura, on the 23rd October, 1937.

There were 125 medical men and women assembled of whom 3 were from Trichinopoly who responded to the kind invitation of the Madura Association, 33 from Ramnad District, 13 from Tinnevelly District and the remaining were from Madura District.

After tea, the meeting began at 5 p.m. The President of the Madura Association Rao Bahadur S. Padmanabha Sarma welcoming the colleagues from the neighbouring districts of Ramnad and Tinnevelly proposed Col. T. S. Sastri, I.M.S., President of the Tinnevelly Association, to the chair. The minutes of the last meetings of the three Associations were read by the respective secretaries and adopted.

The following case reports were given:—

(1) Strangulated hernia with removal of gangrenous gut and making fœcal fistula and later closing the fœcal fistula; specimens of removed appendicular disease; distended uterus with absence of vagina due to retention of menstrual discharge—in this case complete hysterectomy with removal of ovaries was advocated; (2) a case of tetanus; and (3) a case of lockjaw due to carious tooth simulating tetanus.

There was discussion on these cases.

The following resolution was carried unanimously by the gathering:—

"This combined meeting of the Ramnad District, Tinnevelly District and Madura Medical Associations heartily approves the action of the Ministry in abolishing the L. M. P. Courses and converting the Madras Stanley Medical School into a college."

The next resolution "The members of the Madura Medical Association resolve that the Madura Medical Association be converted into a Branch of the Indian Medical Association and that the Governing Body be requested to take necessary steps in the matter"—was after a speech from the Chair passed unanimously by the Madura members.

Papers on Nutrition by Dr. H. S. Thomas of Madura and on the Incidence of Malaria in the Cumbum Valley by R. Krishnaswami were read.

The Chairman before closing the meeting called on Dr. T. S. Shetty to move the following:—

"This meeting of the Ramnad and Tinnevelly District and Madura Medical Associations request the Ministry of Public Health to the Government of Madras to encourage the Indian Medical Industries by insisting the Medical Stores Depot to purchase their requirements from Indian made goods."

After a speech from the chairman regarding the rapid and marked progress in the quality of Indian manufacturers which compare favourably with other foreign products, the resolution was put to the house who adopted it with acclamation.

In winding up the meeting Col. Shastry remarked that the gathering was very unique on account of its large number and the Associations of four southern districts taking part in the function and hoped that such gatherings will take place every now and then.

The guests were all entertained to dinner after which members of the Madura Medical Association with Dr. T. S. Sivaramakrishnan of Ramnad District and the help of Mr. P. Krishnaswami Sastri and other friends staged a Tamil adaptation of Molliere's Mock Doctor, which was appreciated by the audience which included the public of Madura.

The Secretary of Madura Medical Association thanked the guests and those who helped in the successful staging of the drama. Dr. M. N. Rajam of Madura thanked the doctors who contributed liberally

for the functions and those that responded to their invitation, thanked the lecturers of the evening for the valuable and instructive papers and the public who attended the drama.

Captain B. Dayananda Rao replied in appreciative terms, while Col. Sastri spoke in Telugu and Rao Bahadur K. Devaji Rao, on behalf of the public of Madura thanked the Madura Medical Association for the dramatic show.

With the final scenes of the drama the proceedings came to a close by about midnight.

K. S. SRINIVAS, L.M. & S.,
*Secretary.*

* * *

The November meeting of the Ramnad District Medical Association was held on the 20th November, 1937, at the S. M. S. High School, Karaikudi with the President of the Association Captain B. Dayananda Rao in the chair.

The combined meeting of Ramnad District, Tinnevelly District and Madura Medical Associations was held at Madura on the 23rd October, 1937. The minutes of the combined meeting were read by the secretary and adopted; and the secretary was authorised to communicate the resolutions passed at the combined meeting to the press and the authorities concerned.

The secretary announced that the Managing Committee which met earlier that evening recommended:—

1. This Association be made a branch of the Indian Medical Association; also the members may be classified into two groups, namely, regular members who become automatically members of the Indian Medical Association and associate members who are only associate members of the Ramnad District Medical Association without vote in business matters.

2. This Association be made into a branch of the Indian Medical Association forthwith and the secretary is authorised to remit Rs. 1/8/- per paid members being the half-yearly dues to the Indian Medical Association and also communicate the addresses of these members.

3. This Association requests the Government that, in the new Madras Medical Council Act to be passed by the Madras Legislature, in the elected members to the Council proper and proportionate representation of the following groups of practitioners —(1) Independent Medical Practitioners, (2) Rural Medical Practitioners and (3) Municipal and Local Board Employees be given, in the election according to their electoral strength.

After some discussion these recommendations were approved.

T. S. Shetty, K. S. Srinivas and such other members of the Association, who may attend the coming conference (XIV All-India Medical Conference) at Madras were declared as Delegates representing this Association at their cost.

An interesting case operated for a malignant tumor of the orbit by T. S. Shetty was demonstrated and the case report read. After the discussion on this case the meeting terminated with the usual vote of thanks.

K. S. SRINIVAS, L. M. & S.
*Secretary.*

## U. P. PROVINCIAL BRANCH

*Proceedings of the Working Committee Meeting of I. M. A., U. P. Provincial Branch, held on the 10th November, 1937, at 5 p.m. in the Garvie Medical Library Rooms, Town Hall, Meerut.*

*Present*—Dr. S. Halder of Muzaffarnagar, Vice-President in the Chair. Drs. Nawal Behari Lal Mathur of Saharanpur, R. C. Chaurasia of Meerut, S. B. Vyas, Meerut, R. C. Mitter, Meerut, S. N. Banerji, Meerut, Bhupal Singh, Meerut, R. N. Bose, Meerut.

*Proceedings of the last Working Committee were read.* Resolved that the proceedings be confirmed.

*Accounts for October were put up.* (a) Resolved that the accounts be passed, and (b) Further resolved that Rs. 70/12/- be transferred from Special Fund to General Cash, and accounts of the Special Fund be closed. (c) Resolved that a Reserve Fund be created and a sum of Rs. 100/- from General Cash be transferred to the Reserve Fund. (d) Resolved that this sum of Rs. 100/- for reserve fund be kept in fixed deposit in any Bank selected by the Treasurer.

*Provisional Budget of Income and Expenditure for 1937-38.* Resolved that the provisional budget be sanctioned for 1937-38.

*Resolutions of the IV U. P. Medical Conference were considered.* Resolved that the Secretary be requested to communicate with the following about resolutions noted against their names:—(1) Hon'ble Minister I/C Medical Department—2, 4, 5, 6, 7, 9, 10, 12, 13 and 14. (2) I. G. C. H., U. P.—9. (3) Central Council of I. M. A.—4, 8, 10, 11, 13 and 14. (4) Members, U. P. Medical Council—9, 10, 12, 13 and 14. (5) Members, State Medical Faculty—10.

*Consideration of situation created by the pamphlet issued under the signatures of 4 Licentiates asking the Licentiates to withdraw from membership of the I. M. A.* The Provincial Secretary read a draft prepared by him in which he has answered and refuted the charges made in the Licentiates' pamphlet: Resolved that the draft be approved and that copies of the same be sent to—(1) The Secretaries of Branches of I. M. A. in U. P. with enough copies to send to each member of Branches with a request to hold a meeting and discuss this question in the light of this reply. (2) The Journal of I. M. A. and Indian Medical Journal. (3) To all other Branches of I. M. A. outside U. P.

*Question of ways and means to organise the remaining districts of U. P. and to establish Branches there.* Resolved that a sum of Rs. 100/- be sent to Dr. S. K. Chowdhury, President of the Benares Branch to be used for travelling, etc., to organise the eastern districts and form Branches of I. M. A. in these districts.

*Application for increment of pay of the Clerk, B. Kripa Ram Gupta, B.A.* Resolved that an increment in pay of Rs. 4/- p.m. be given to him with effect from the 1st November, 1937. The total pay per month will thus be Rs. 24/- per month.

With a vote of thanks to the Chair the meeting dispersed.

R. N. BOSE, *Hony. Jt. Secretary.* S. HALDER, *Chairman.*

## DEORIA MEDICAL ASSOCIATION

A monthly meeting of the above Association was held on 12th November, 1937, at the residence of the President, Dr. S. S. Misra, Deoria. Most of the members were present in the meeting. The host occupied the chair.

Very interesting cases of Acne Vulgaris on the extremities and Peripheral Facial Spasm were demonstrated by Dr. Misra and Dr. Srivastava respectively. In addition to other important works, the following resolutions were unanimously passed:—

1. "Be it resolved that the Deoria Medical Association declares it most emphatically and unequivocally that the present U. P. Standing Committee of the All-India Licentiates Association has consciously or unconsciously, done a distinct dis-service to the cause of the licentiates of the United Provinces by advising the Licentiates to resign their membership of the Indian Medical Association and to boycott the IV-U. P. Medical Conference, 1937. This Association holds the opinion that these actions of the above Standing Committee were ill-advised, suicidal and detrimental to the interests of the Indian Medical Profession in general and the medical Licentiates in particular. This association is prepared to admit that the reasons, that have been put forward by the Standing Committee for the severance of connection with the Indian Medical Association, are undoubtedly very sad and tell a pathetic tale, but it is not prepared to admit that separation is the only panacea to cure all these evils; in the opinion of this Association it will rather doubly strengthen the hands of the reactionary elements, who will, finding the opposition absent, take the advantage of openly exhibiting their hostile attitude towards the cause, that has been so eminently advocated by the All-India Licentiates' Association.

Under the circumstances, this Association standing firmly by the Indian Medical Association, earnestly appeals to each and every Licentiate of the United Province to remain and to come more in number under the banner of the Indian Medical Association and ventilate their legitimate grievances through the press and platform of this great organisation.

(a) This Association warmly praises those Licentiates, who, instead of being carried away by the provocative newspaper propaganda, had the moral courage of retaining the membership of I. M. A. and attending the function of the IV-U. P. Medical Conference held at Benares, totally ignoring the so-called 'mandate' of the U. P. Standing Committee of the All-India Licentiates' Association.

(b) A copy of the above resolutions be sent to the All-India Licentiates Association, and its U. P. Standing Committee."

2. "Whereas the Tahsil Deoria railway station and its yards are situated just in the heart of the Deoria town and whereas the big ditches within these yards (just north to the railway lines) having been converted into favourable mosquito-breeding grounds and emanating suffocating foul odour from their filthy and decomposed stagnant water, this Association, for the safety of the public health of the town suggests to the authorities concerned to take immediate step for either filling up the ditches or making an outlet for flowing down these waters direct into the Karunna Nala, which passes so close by the railway station.

(a) A copy of this resolution be forwarded to each of the Traffic Manager, B. & N. W. Ry. Gorakhpur, The Sub-Divisional Officer, Deoria-Kasia, Deoria, and the Chairman, Notified Area Committee, Deoria.

3. "This Association views with regret that no effect has yet been given by the Mahaswastika Mills of Deoria, and the

Noori Sugar Mills, Bhatni, to the resolution unanimously passed by this Association on the 8th August, 1937, and on which the Chief Inspector of Factories and Civil Surgeon, Gorakhpur, have very kindly taken prompt steps. It further places on record its great resentment at the defying attitude of the above two mills and reminds the authorities concerned to appoint qualified doctors in the above mills very soon for ensuring the safety of the lives of their employees.

(a) A copy of this resolution be forwarded to the Chief Inspector of Factories, U. P., Cawnpore, the Civil Surgeon, Gorakhpur, and the Managers of the Mahaswastika Sugar and Industrial Corporation, Deoria and the Noori Sugar Works, Bhatni."

4. " This Association views with profound regret the present awfully insanitary condition of the soakage-pits and connected main-drain of Deoria, where the sewage has been allowed to accumulate for the last several months and there is not the slightest attempt on the part of the executive authorities of the Notified Area Committee for the elimination of this long-standing sewer-water; the result is,—the whole area leading from the above soakage-pit upto the mission house has been turned into a hell,—most obnoxious, offensive and suffocating sewer-gas is growing and spreading into the town, violently threating its public health with the possibility of an out-break of epidemic diseases. Looking at the extreme apathy of the said guardians of public health and sanitation, this Association hereby resolves to invite the attention of the Joint Magistrate, Deoria, the District Magistrate, Gorakhpur, to investigate into the matter and deal with it in the way they think proper."

After the meeting was over Dr. S. S. Misra was 'At Home' to the members present.

S. N. MUKHERJEE,
*Hony. Secretary.*

## TINNEVELLY DISTRICT MEDICAL ASSOCIATION

The Tinnevelly District Medical Association held its monthly meeting on the 27th November, 1937, at the St. John's College Hall, Palamcottah. Fifty-five members including 3 women doctors, were present.

Lieut-Col. T. S. Shastry, I.M.S., presided. The Secretary and Treasurer, Dr. K. Rama Ayyar, M.B.B.S., (Andhra), read the minutes of the Joint Meeting held at Madura on the 23rd of October, 1937. Then the President requested all the members of the Association to attend the XIV All-India Medical Conference at Madras in as large numbers as possible. He announced that the ensuing Anniversary was to be celebrated in January, 1938.

Dr. Dutt, gave an interesting lecture on Vitamin C and its tests.

Dr. P. S. Srinivasan, read notes of and demonstrated the following cases to the members.

(1) Tubercular joint (ankle).

(2) Tubercular femur and abscess thigh.

(3) Stab-injury chest exposing the lung.

(4) Appendicular abscess.

(5) Cancer thyroid—with metastasis in ribs and the tibia.

(6) Fibro-epulis upper right maxilla.

The cases were fully discussed by the members. In this connection the beneficial effect of treating tubercular sinuses and tuberculosis of other organs by garlic and its juice was pointed out. It was considered that this drug is worth trying in all tubercular cases. Then the President brought the meeting to a close by his remarks on the subject and summed up the salient and important features of all the cases. He thanked the College authorities for placing the College Hall at the disposal of the Tinnevelly District Medical Association for holding the meeting. He also thanked the musician Sankaralingam Ayyar for his kind performance.

A dinner brought the function to a close.

### HEALTH EXHIBITION

In connection with its monthly meeting a Health Exhibition was arranged at the Municipal Office, Palamcottah, on the 27th November, 1937, at 10 a.m. which was attended by a large number of men and women teachers, and 100 boys and girls.

Dr. Rajarathnam, L.M. & S., B.Sc., Municipal Health Officer, Tinnevelly, opened the Exhibition and delivered an interesting lecture in Tamil about Sanitation.

Lieut.-Col. T. S. Shastry, I.M.S., explained in English the defects of our dietary in detail and pleaded for systematic and daily use in every household, hand-pounded bran rice, milk-products, (milk, butter, cream and curd), and green leaves and fresh vegetables. He said that it is for the teachers to teach their pupils lessons of health as it is only through them that the future citizens may be healthy and strong.

The Exhibits consisted of posters on tuberculosis, small-pox, cholera, flies, mosquitoes, and malaria.

This was very much appreciated by the public, particularly by the teachers.

The Exhibition was kept open till late in the evening and was attended by teachers, boys and girls in batches.

K. RAMA AYYAR, M.B.B.S. (Andhra),
*Secretary & Treasurer.*

## GONDA BRANCH

At an extraordinary meeting of the Gonda Branch, held at the residence of Dr. P. C. Mukerji, the President, on 27th November, 1937, the following resolution was put from the Chair and carried, all members standing:—

This meeting of the Indian Medical Association, Gonda Branch, Gonda, places on record its sense of profound grief at the sad demise of Sir J. C. Bose, one of the greatest of the Indian Scientists of the world and expresses its heart-felt sympathy with Lady Bose, and other members of the family in their bereavement.

PURNA CH. MUKHERJI, *President.* S. B. SINHA, M.B., B.S. *Honorary Secretary.*

## MOTIHARI BRANCH

*Proceedings of the meeting held on 1st November, 1937.*

*Present*—Rai Bahadur Dr. T. C. Guha, President, Rai Bahadur Dr. Ramdhari Singh, Drs. A. K. Guha, Harishanker Prasad, Kailash Behari Sahay, Sarjug Prasad, Kanti Bhushan Banerjee, Miss C. Sigler and Shyama Kant Verma, Secretary.

1. Proceedings of the last meeting were read and confirmed.

2. It is resolved that we do not propose any alteration to be made to the proposed amended rules of I. M. A.

3. Read letter of the General Secretary to attend the XIV Medical Congress. The paper was put on the table and every member was requested to attend the Congress.

S. K. VERMA, *Secretary.* T. C. GUHA, *President.*

## AMRITSAR BRANCH

The following office-bearers were elected at a meeting held on the 2nd October, 1937.

*President*—Dr. Karam Chand Passi, M.B.B.S.
*Vice-President*—Dr. Mohd. Sharif, M.B.B.S.
*Secretary*—Dr. Faquir Chand Shori, M.B.B.S.
*Jt. Secretary*—Dr. Gian Chand Ghulati, M.B.B.S.
*Treasurer*—Dr. Radha Kishen Malhotra, M.B.B.S.

*Members of the Executive Committee*—Dr. Bhagwan Singh, Uppal, L.C.P.S., Dr. Hiralal Bawa, L.S.M.F., Dr. Chunilal Chathrath, L.S.M.F., and Dr. Jugal Kishore Nayar, M.B.B.S.

FAQUIR CHAND SHORI,
*Secretary.*

# II MAHARASHTRA & KARNATAK MEDICAL CONFERENCE

## PRESIDENTIAL ADDRESS BY DR. K. S. MHASKAR, M.A., B.SC., M.D., (BOM.), D.P.H. (LOND.), D.T.M. & H. (CANTAB.).

Your Holiness, Your Highness,
Ladies and gentlemen,

I thank you most heartily for the high honour you have done me in inviting me to preside over your second Annual Medical Conference and permitting me to address such an illustrious gathering of the luminaries of our profession. But before doing so, I would like to associate myself with you all in felicitating and congratulating your last year's President Dr. M. D. Gilder, a doyen of our profession loved and respected by us all for the outstanding qualities he has shown in his career and is showing in the new sphere he now occupies. It is a career well worth watching and imitating not for the sake of the authority and high position it offers but for the sake of great opportunities of meritorious service to the profession and to the public; a career which has not limited itself to the narrow groove of the healing art, but has carved out new and broader paths for the betterment of the profession and for the betterment of medical education and Medical Science. I wish him success.

2. We are passing through strenuous times. India is advancing fast; traditions, superstitions, and old customs are being knocked off like nine-pins overnight, and I often tremble to find myself out of date when I open my morning paper and find something new that I have to learn and something old that I have to unlearn. The advent of reforms is likely to make our present complications still further complicated and would require cool thinking and steadiness of purpose if our hopes and ambitions are to be realised. The Memorandum from the Representatives of three prominent Medical Associations recently addressed to Dr. Gilder, the Honorable Minister of Health, Bombay, states the more immediate and urgent problems which face the medical profession and with which this Conference may express its complete agreement ; but there are certain other problems which require a solution from us.

### Unemployment in the Medical Profession

3. Of these, none is more acute than unemployment among our profession. It is sad indeed; but when unemployment is rampant everywhere it would be futile to expect our profession to escape the same. We receive the best of education and we pay very dearly for it. The best of brains guide us in our student days; high ideals are placed before us; we read continually of new and marvellous discoveries and if our imagination were not fired by the glorious achievements of others, we would be poor material indeed, and deserve the fate of unemployment and starvation. It is not money, nor glory, as the world counts it, that most of us desire, but the satisfaction of having made the best use of our abilities and of duty done. Who wouldn't aspire for glory, honour, respectability and for money lawfully obtained to enable one to equip one's children with the same high class education and something more? Those who ruled our destinies did the best by us and hoped for better times. But the supply has outrun the demand and better times have not yet turned up. The economic condition is said to be worsening year after year and until this improves we have to help ourselves.

4. Adjustments will have to take place and there is bound to be much heart-burning and sacrifice of ambition before order sets in. Various methods of limiting the supply have been suggested, of which stiffer examinations is one and dispersal to rustic areas is another. The juniors among us are advised to make a move to the villages and smaller towns and be satisfied with humdrum work and less payment. The medical profession has never been out for money and it is not much enamoured of the attractions of a city life. All that we expect is a living wage to give us that ease of mind to attend to our patients, work suited to our abilities, and facilities

*The Second Maharashtra and Karnatak Medical Conference was held in October, 1937, at Kolhapur.

to improve our store of knowledge. It is an experiment worthy of trial till adjustments take place; means of transit have improved immensely; roads are better constructed and the Railway and the Motor have made easily accessible many places which it would otherwise have taken hours to reach. A number of villages can easily be catered for from a central place which would in turn be not so distant from the centres of learning in towns and cities of the Presidency.

### Service and Sacrifice—Our Motto

5. If consolation were needed for this lowering of the standard of our ambition and of our ideal, let us remember that Medicine was never intended to be a career for advancement in life. It used to be originally a call from Heaven for the service of others, for the alleviation of their suffering, and the prevention of disease.

Service and sacrifice is the motto of our profession. Medical Science is advancing fast, and if our service is not to be slip-shod and our sacrifice superficial, we must make continuous efforts to remain abreast of the times and pass on the fruits of newer knowledge and education to the public. It is easy enough to acquire knowledge in our student days. The difficult part is to have opportunities to do so in later life. The conception of medical man's duties has been changing through ages but never so rapidly as it has during the last three decades, for we are discovering that our knowledge is almost out of date, even so soon as after taking our diploma from the University. There is nothing more precious to us than this continuous thirst of knowledge to increase our efficiency for the service of Humanity and when I mention service I do not limit myself to the narrow field of suffering and disabilities of the physical body but also those of the intellectual and spiritual body,—the Trinity which together makes up man. Fractionation and specialization have gone too far. We have now to synthetize again and review if we cannot render more efficient service from a higher and broader plane. We want to serve man as a whole.

### Specialization

6. This is where we started from at the beginning of the world, when the world was small and the patriarch of the family combined in himself the threefold duties of a spiritual healer and the healer of the intellect and of the body—the priest, the teacher and the doctor being rolled in him into one. These tended to be separate through later centuries, but he who was holy as well, has always been regarded the best medicine man. Commonsense, tact, patience and optimism were his stock-in-trade. Infecting others with an optimism which is not their own, creating confidence in their own powers and helping them to stand on their own legs is what is called a Faith-cure and we now term Psychotherapy. Specialisation went on apace, but he who could combine two or more specialities like the above was considered a better man.

7. Intense specialization has now received a set-back. There would not hereafter be independent doctors to deal with diseases of the eye, the teeth, the lungs and the heart: but they would all be rolled into one common body as is seen in a few prominent clinics in Bombay and in some Presidency town Hospitals. It is self-evident that no single person can hereafter combine in himself the aptitude of several specialists if efficiency is to be maintained. The synthetic process has begun and is likely to yield fruitful results both to the public and to the profession, and I hope it will not stop short at the treatment of disease.

### The Synthesis Towards Health

8. The medical profession has unfortunately been continually associated with the idea of healing and not of health, with the ideas of disease, suffering and death rather than with the joys and ambitions of life. Vulgar jokes about death and doctor are current in every language of the world. Proverbs like " May the doctor die after the need is over " illustrate very concisely the undeserved contempt and hatred with which a medical man is treated—a hatred which is often translated into punishment by withholding his legitimate dues. Fortunately for us, our high ideal to remain students for the whole of our life and our love for research has come to our rescue. The research may not have been wholly carried out by us in India; but in this world-brotherhood of the profession, we have as much claim to profit by what others have done elsewhere, as they have to profit by the contributions we have made.

9. The ideal of the treatment of disease has gradually during the last forty years yielded place to that of prevention of disease which in turn is, during the last fifteen years, yielding place to positive assertion of Health, and I would not be surprised if most of us live to see the day when health of the body would not be considered as a profession apart, but would merge in the greater whole which goes to form a man. Spiritual health, intellectual health and physical health, are the Trinity on which we base the advancement of self, of the society and of the world.

10. Of the many factors which require consideration in matters of health, two stand out most prominently, nutrition and training. The where-with-all to supply adequate energy and development, and the capacity to direct that energy in proper channels. The former is almost overdone, the latter is almost neglected. Nearly every one considers himself an authority where nutrition is concerned and feels that there is nothing new to learn. He has to be taught that different angles of vision exist. Physical training is still an anathema to most people; it is still a bitter pill that one has to swallow in the morning or in the evening; and an off-day like Sunday is still looked forward to, with relief. New methods have to be evolved to sugar-coat the pill. All this means preparation, deliberation, evaluation and selection. We have not even the time to hasten slowly and if we are not ready with our answers, there is the possibility of the quacks and self-styled professors stealing a march on us and establishing their priority claims. The saddest part is that we have few data of our own with which a useful start can be made.

### Physical and Nutritional Education

11. This double task is not an easy one and adaptation can come but slowly. We have ourselves much to learn before we begin to teach others. Our medical curriculum as it is, is overloaded with the imparting of education to diagnose and to treat disease, and the student considers himself well in advance of the rest if he knows a bit of the prevention of disease. His attitude towards the problems of health is still that of indifference, almost amounting to contempt. He knows nothing about physical education, physical culture and physical training. There are gymnasia and sports' club attached to the colleges but they are there as mere adjuncts to develop one's fads or as mere sources of recreation. Recreation is still considered necessary, in order to equip oneself with the requisite energy to go through one's daily toil and to pass the examinations creditably rather than as a thing essential in itself for the development of the character of man.

12. It is again a question of demand and supply. The demand is now there and we have to supply the need. We want more education to increase our efficiency; as to how and when it can be obtained, only time can solve the problem. We have at present to take stock of our requirements and deliberate on the best methods of achieving the same. We may not succeed in garnering the fruits of our labours for our immediate advancement but we can lay the foundations this day, so that our juniors or the juniors of our juniors may profit by the same. I would consider it an immense gain to our profession if we but get dissociated from the idea of disease and be permanently associated with the positive idea of health and healthy life.

### Physical Training

13. Physical training and physical culture have been making immense strides all the world over. New ideas and new systems are being tested some of which have come to stay. I wonder how many of them will stand the test of Science. India already possesses a rich store of this knowledge, a part of which—Yogic exercises—has received the sanction of the spiritual authorities among our ancients; before we adopt anything from the West, India would demand of us an explanation on the relative merits and demerits of these truly Indian systems. Like the Ayurvedic System of Medicine, they are supposed to be cheap, efficient and easily available and are thus within the reach of the poor.

14. There is yet another aspect of physical training sealed to us, the subject of massage. Medical message, passive and active massage as a therapeutic measure for disease and for health has been allowed to remain with the *dais* and the barbar class. The art still lives in Malabar and deserves acquaintance. Medical men of the West can eke out a decent and respectable living out of this art, there is no loss of dignity if our juniors

were to give a trial to it. I am but suggesting means to reduce unemployment among us.

15. A commission has lately been appointed by the Bombay Government to advise on the introduction of physical education and physical training, a subject which ought to fall within the purview of the medical profession and yet I find in the list, the names of our medical luminaries conspicuous by their absence. We have no desire to put our finger in each pie. Perhaps Dr. Gilder could not suggest some one competent enough from among us who would deal efficiently with the manifold aspects of physical education. If that be so, it is time that we wake up and increase our efficiency in this part of our education so that none dare ignore us in future if common good is to be achieved. Physical education cannot stand apart from Medicine if the object is to achieve a high level of general health. If medical men are necessary for the assessment of this health, they ought to be much more so in laying down the steps to achieve the same.

### The Need of Nutritional Studies

16. Theoretical study and practical training are necessary for realising the ideal of manhood in its threefold aspect. But the basis of it all is the nutrition of the body. We can deal with this subject competently when any system in the body is diseased. Dietetic treatment of kidney disease, diabetes, tuberculosis and a host of other diseased conditions is embodied in our medical curriculum; but what is not embodied therein and is often neglected by the College authorities is instruction in Nutrition required to attain health during the changing periods of life.

17. Our high Infant Mortality has scared the public and the medical profession sufficiently enough, yet few practitioners can give a detailed instruction in the proper rearing up of a child. Attend any Infant Welfare Centre and it will break your heart to see the appalling ignorance, superstitious beliefs, and unqualified faith in old traditions displayed by the mothers and their seniors. There is a reason for it and we are paying for our sins in a thousandfold way. Attend any out-patients dispensary, whether it be private or public and you will hardly find one there who wants information or a prescription on the manifold difficulties he experiences in order to remain healthy. The high morbidity and mortality of mothers during and after the natal periods are due to systematic neglect of this subject by our ancients. Ayurved neglected this subject and coolly handed it over to the ignorant and elderly women of the community. As a natural corollary to this, the care of the growing child in health and in disease also passed to them and this section in Ayurved has also remained undeveloped. Traditions and superstitions are difficult to kill but a beginning has to be made somewhere, and nowhere can it be more usefully made than at the beginning of life. That is the reason of the starting of infant welfare centres.

18. What an uphill task lies before us there! This part of our duty has been systematically ignored from time immemorial. We have made a fetish of expert knowledge of disease and have ignored the common everyday need of health. Ask a student questions on headaches, common colds, pains, etc., and he shutters and fumbles; ask him the most abstruse items of a disease and he will reel off his answers at his fingers' ends.

19. We ought to have clinics and dispensaries not only for treating or warding off disease but for advice in health matters. Watch the patients and their relations in a dispensary with their long drawn anxious faces and haggard eyes with continuous night-watching and if a laugh is raised there it seems so out of place. Watch a Welfare Centre where the clientele is bubbling with laughter and smiles, the wriggling of infants and the care-free fondling of mothers. What a contrast! Who would not desire to spare a minute or two to share the joys of others and forget his sorrows and shortcomings!

### Infant and Child-welfare, Ante-Natal and Post-Natal Centres

20. Such a clientele is ours for the mere asking of it, if we but have the education to impart to them the necessary help. What is true of these Infant Welfare Centres or dispensaries is also true of Ante-natal and Post-natal Welfare Centres or dispensaries and can be made true for any other period of life of both man and woman. We are also realizing its advantages where medical care of school-going children has been insisted on. I assure you I have heard encomiums from the poor parents for such kind of work which the Bombay Infant Welfare Society,

the Bombay Mofussil Maternity Council and the Bombay Municipal Corporation are carrying out, I offer you yet another means of relieving our unemployment.

### Nutrition in Health

21. We know very little of nutrition in health. Vast amount of literature which exists in the West ought to serve as a useful guide to us. We have yet to test it and to adopt it to our conditions. The advantages of such nutrition are obvious to us all. Economy is money and in the quantity and quality of the food used is the key-note of it all. Growth in height and weight, longevity, vitality, healthy progeny and freedom from disease are the minimum of benefits it confers on those who use the knowledge intelligently. Every family ought to be educated with the rudiments of this knowledge. India is poor, but with care, what little we have, may be made to go a long way. Even if we gain one more day of life and lose less in days of sickness it would be an economic asset to the nation. There are fads and fads in nutrition and caution must be our watchword if we desire not to be stamped with the contemptuous stigma of continually changing our opinion. We want research even if it be to examine what the West has to teach us. We want to be sure of the benefits of what we adopt from the West and we want to find out something that will suit our needs. We are attempting to serve the public to the best of our ability and to save them both from suffering and money. The Central and Provincial Governments have just taken the lead in the investigation of Nutrition and the results thereof can be passed on to the public only through the medium of the medical practitioner if efficiency and economy are desired. Many of us are already visualising the day when nutrition clinics will be a feature of our land. Almost all the investigations have so far been in the Laboratory. A unique investigation, almost the first of its kind in India, is being carried out by the Bombay Presidency Baby and Health Week Association jointly with the Physiological Department of the Gordhandas Sunderdas Medical College, Bombay, and subjects for this food experiment are the boys of growing age from the David Sassoon Industrial School. We are attempting to find a diet adequate in quantity and quality for the poor of our country. We hope to release the results to the public in a few months.

22. This investigation is but one of the series which begins with that of infants and ends with that of old age. We want a lot of reliable observations on diet and nutrition from the various parts of the Presidency; and District Medical Associations can render valuable contributions by observing what they actually find in villages and in towns with reference to diet and health.

### Hospitalization of the Sick

23. The advent of Hospitals curtailed our clientele among the sick and the disabled just for a time, until adjustments took place. The initiation of Preventive Medicine gave us another just such rude shock. We have profited by both, and hope to profit still further. The idea of Hospitalization of the sick is continually gaining ground not only in Bombay but also in Mofussil towns and nowhere is this more evident than in the branch of Obstetrics. Maternity Homes are springing up like mushrooms and are paying their way whether they be in towns or in rural areas, in spite of Simla regarding it as a backward move. Many of the Hospitals in towns are being staffed by Honorary workers, each one an authority in his department and this has increased their popularity. A good action blesses at either end. It has enabled our juniors to stand on their legs with respectability; it has proved advantageous to the public. Those who formerly were scared by the Hospitals now freely seek their help. Prejudices are dying fast and are being replaced by robust conviction.

24. Co-operative Hospitals like those in Hubli and Nursing Homes are a prominent feature in Bombay and in the Mofussil. Dr. Sardesai of Bombay has shown what can be done for Ophthalmology in rural areas. The working of the Mission Hospitals adds to our hope. Let the juniors combine. Travel is becoming cheaper and faster. To take a round of a few villages by motor and be back by the evening at the Headquarters is now within the limits of possibility. A little more venture, and a little more organisation, and co-operation might work wonders even without government aid.

### Co-operation

25. The days of working alone by oneself are long past. In the assessment of health as that of

disease, the aid of various specialists is required whose advice would be properly evaluated and balanced by one master-mind so that the needy person gets a complete idea of what he is to expect. In research likewise, the chances of individual distinction are getting fewer and close co-operation between the various branches of science is becoming an essential factor of success. There is no finality in the conclusions arrived at, for a new research problem begins where the old ones end. The labours of one scientist are but a stepping stone to the glory of others. If that be so, there is more gain in co-operation than in individual effort. Never lose heart even though the results be negative. Scientific research in nutrition is making enormous strides and what was axiomatic yesterday seems to the public out-of-date to-day. Societies, associations and committees are needed to round off the angularities both in hospital practice and in research, to present a view commonly agreed upon and to undertake the distribution of further work. The more there is of such teaching, the less would be the chances of an upstart, a quack, or a parasite profiting by the gaps in our knowledge and swindling the public to his own advantage.

## Summary

26. I feel very keenly this unemployment among the intelligentia of our land and the remedy offered is worse than the disease. Rural districts require medical help but not from the medical fraternity I see around me here. Let lesser lights take up that work. More important work lies before us which is bound to bring us decent living. We ought to take the lead in dispensing health knowledge for all periods and walks of life, be able to prescribe exercises and massage suited to the peculiar needs of the individual and adjust the diet from time to time according to the age, vocation, climate, physical condition and financial capacity of the individual. We ought to lead in guiding the health problems of the nation and keeping them along proper channels. What we really want is dispensaries or clinics for the dispensation of health knowledge. We already have a section of these, the *vyayamshalas* or the clinics for imparting physical training, massage, etc., but these are few and far between and in towns they are so few indeed. We now want nutrition clinics on scientific lines. The need of such has long been felt.

27. The advent of hospitals curtailed our clientele among the sick, and the disabled but if my reading of the present situation is correct, an infinitely larger clientele of the healthy ones is soon becoming accessible to us. We must shake off our association with disease. If we become dispensers of health, the whole world is our clientele; God intended it to be so at the beginning of the world.

## Sickness Insurance

28. It is just for this reason that until times improve we must give a helping hand to the juniors amongst us, protect them from want, look after them in their sickness, find them new jobs, provide them with faciliites for continuous education, find new channels for their enthusiasm and energies and above all guard them from the possible rot which idle hands and idle brains are prone to. The movement to be initiated by this Conference could not have come at a more opportune moment. Charity must begin at home. The medical profession has always been noted for its sacrifices both in money and in person, both for the sake of the public at large and for the advancement of medical science. I do hope that the scheme for relief of unemployment and sickness-insurance for ourselves will meet the approval of this Conference and receive liberal financial support.

## Refresher Courses

29. Medical education is a continuous and life-long process if the service to be rendered is to be a faithful and efficient one. Opportunities for clinical experience, operative technique and laboratory investigation are limited to a private practitioner. The institution of "Post-Graduate Refresher Courses" in the centres of education like those in Bombay, Poona and Ahmedabad is almost overdue. The Obstetric and Gynæcologial Society, Bombay had organised such a week's course at the beginning of this year, which was highly appreciated by a large number of practitioners from the Presidency. Provincial Conferences like to-day's have also an educative value but on a very limited scale. If our honoured guests from Bombay were to give it a

thought and organise a variety of such courses from time to time, they will not only be doing immense service to their brother practitioners and earn their gratitude but will also help to increase the solidarity of the profession.

### The Claims of Ayurved

30. I crave your indulgence for yet one more item before I bring my observations to a close. It does not concern this Conference directly but I feel that some reference to it may be expected of us. Out of the great many questions agitating the public mind at present there is one which is supposed to concern us most as we are represented to be its traditional enemies. We have often been accused of lack of patriotism and of lack of pride in the store of medical knowledge garnered by our ancients. We have been accused of making a fetish of medicine as handed over to us by western scientists. We have been accused of trying to keep the medical profession in our hands with mercenary motives and of deliberately villifying Ayurveda. I have been an intimate student of Ayurveda during the last twenty-five years and have from time to time tried to find order in the almost chaotic mass of Ayurvedic literature available to us; I am not a lonely worker either in this field of living antiquity, and I am glad to note that the attempts made by us to understand Ayurveda, in this presidency as well as in the rest of India, far outnumber those made by the exponents of that system. My comparative and exhaustive studies in Ophthalmology, Obstetrics, Gynæcology and Pediatrics have been highly praised by their Conferences and stand to this day unrivalled in the technique of the investigation of this subject. My attempts in the elucidation of the pharmacology of Ayurvedic drugs are before you all and the thesis on Snake-bite and Scorpion-sting remedies have been acclaimed by the enlightened public, though it proved to be a bitter pill to the Ayurvedists, for I asked them to expunge these ante-deluvian methods from their present day curriculum and save the public from fraud and quackery. I am not a vain boaster but it is good to enumerate what lies on the credit side when I make a statement on the debit side. I see before me here many of my confreres who are proud to mention the bright side of their medical experiences, for many of us are still ardent students of Ayurveda. If money and proper men be available, we still welcome the continuation of these investigations which they have neglected. Dr. Jivraj Mehta, the Dean of the Gordhandas Sunderdas Medical College and a luminary of the medical profession, stated even last year as the President of the Khandesh Medical Conference "that if a Chair on the ancient Indian system of medicine be instituted in the medical colleges it would undoubtedly be in the best interest of medical education and research and consequently of medical science." Dr. Jivraj Mehta and we are prepared to go thus far and no further. Prove your worth and the doors of medical science are open to you for recognition was the slogan for the last thirty years. None—not even the Ayurvedists—denied that Ayurveda required much shifting and the separation of the valuable from the worthless. We are now on the eve of volcanic changes and there are great possibilities of the whole being accepted by the public *ad hoc* as valuable. We welcome the change for it gives us greater opportunities to watch at closer range what has up till now been denied to us. If scientific spirit and not blind faith continues to actuate the exponents of the system, I already foresee the day when both of us stand to gain by this change. I commend to you the reports of the investigations carried out by the famous Shri Dhuta-papeshwar Ayurvedic Trust at Panvel and they support what I have been continually repeating here and elsewhere.

31. But the exponents of the system have decided to take what seems to me a wrong turning:—(1) The introduction of superficial mixed and short training, (2) The claim of equality of status for such raw recruits to the profession and (3) the starting of Ayurvedic hospitals and dispensaries. In their nervousness that Ayurveda cannot stand fair comparison, they are bolstering up their educational curriculum with foreign anatomy and physiology, with surgery, midwifery, gynæcology, ophthalmology, with hygiene and with almost everything else but the theory of medicine; even part of the practice of medicine is not their own; there actual practice of medicine is often dissociated from the statements made in the Ayurvedic works of authority; when I see all this and the articles they publish, I often ask myself "*Where is Ayurveda*"! The new Ayurvedic student has little time left to ponder over these ancient books and within three or four years is ready

to claim equal status with the rest of us. If there may be any danger to Ayurveda, I am inclined to believe that it is of their own creation. The admixture of foreign knowledge and the introduction of superficial study are but the thin ends of the wedges which will break up this traditional lore and postpone the happy day of establishing its true merit. In the hurry to establish their rights, I believe they have overshot the mark. It is a situation deplored by many of us and by the savants of the old school of Ayurveda. The infusion of raw blood with its mixed and short training is likely to hamper future investigation in Ayurveda, and the elucidation of those simple truths and marvellous cures which even to this day stand to the credit of Ayurveda and brighten its firmament.

32. We are repeatedly told that we fear competition and we use artificial means to hold back their recognition and progress. I have the honour to count among my colleagues many of their best savants, but I draw the line at this level. We welcome the new change and shall help and guide it to the advantage of the public if we are permitted to do so. Their new curriculum is less ambitious, less strenuous and fairly covers the field which the old L. C. P. S. and the L. M. P. were expected to garner. If these new recruits would not consider it *infra-dig*, I suggest that there will always be enough rural work commensurate with the education they have received.

33. They are also asking for registration. I consider that the earlier it comes the better. It is bound to profit us both. Quackery has been a curse the world over and is more so in India. Let us have some standard of education or experience to enable the public to choose good from evil and to protect them from exploitation. The negotiation of this turnstile will bring the solution of the question of standardisation of drugs and prevention of adulteration still nearer, for they feel the need of it far more keenly than we do.

34. A presidential address is always a long-winded affair; that occasion and necessity demanded it, is my humble excuse. I thank you very sincerely again for the high honour you bestowed on me by electing me your President this year.

## RESOLUTIONS PASSED

1. *Standing Committee of the Conference:* In order to improve the lot of the practitioner and his professional ability, this Conference is emphatically of opinion that it should be made a permanent Institution and appoints a Standing Committee with powers to co-opt, to implement its resolutions throughout the year and to report its work at the next Conference.

The Committee shall this year consist of the President and Secretaries of this Conference as *Ex-Officio* members and two members:—Dr. L. D. Dhawale, B.A., M.D., and Dr. B. G. Vad, M.D.

2. *Congratulations to the Hon'ble Dr. M. D. D. Gilder,* M.D., F.R.C.S.,:—This Conference offers its sincere and hearty congratulations to Honourable Dr. M. D. D. Gilder, M.D., F.R.C.S., last year's President of the Conference, on being selected as the Minister of Health and Excise to the Government of Bombay and feels confident that he will advance the interest of the Medical Profession.

3. *Representation on the Physical Education Committee of the Government of Bombay:* This Conference notes with regret the omission of eminent medical men or accredited representatives of Medical Associations on the Physical Education Committee recently appointed by Government; and places on record its sense of disappointment at the failure of Government to recognise the medical aspects of Physical Education.

4. *Research and Diploma in the Indigenous System of Medicine:* In view of the fact that an important minority of the subjects of this province insistently and persistently demand aid from the Government of Bombay to revive the indigenous system of medicine;

In view of the fact that the present governing bodies of the schools of the indigenous system of medicine demand that the various branches of the Western Science of Medicine and the knowledge of the therapeutic procedures connected with them,

should be incorporated in the curriculum of the studies of the indigenous system of medicine, as they are conscious of the inadequacy of the therapeutic measures adopted by them in the treatment of various diseases;

In view of the fact that the present curriculum of studies of the Western Science of Medicine is heavy and taxing and hardly leaves sufficient time for its student to come up to the standard of efficiency required for everyday practice of medicine; and therefore would hardly leave any time for them to study, in addition, the indigenous system of medicine;

And as various drugs of the indigenous system of medicine have been found to be efficient in the treatment of certain diseases which humanity is prone to;

And as this Conference feels that there is an urgent necessity for full investigation of the indigenous system of medicine;

This Conference recommends to the Government of Bombay that all its efforts in this direction should be confined only to promote the research of the indigenous system of medicine through units which shall consist of (1) one or more duly and highly qualified Indian physicians and (2) an equal number of physicians practising only in the indigenous system of medicine, elected by the All-India Vaidya Sammelan or any other corresponding Bombay-Province body;

And that these units shall be attached to a public hospital which shall be in a position to afford clinical, pathological and pharmacological facilities;

And that a diploma (which shall not be instituted for five years more) in the indigenous system of medicine shall be conferred upon any person holding registrable medical qualification, not within one year of passing the final medical examination, after he satisfies an examining body, selected from these units, in the theoretical and practical examination in the indigenous system of medicine.

5. *Nutritional Research of Indian Diets*: This Conference urges upon Government the necessity of Nutritional Research of Indian Diets and demands a substantial donation for the same.

6. *Endorsement of Memorandum*: This Conference unanimously endorses the Memorandum to the Minister of Health from the three prominent Medical Associations, *viz.*:—

(i) The Bombay Branch of the Indian Medical Association.

(ii) The Bombay Obstetrics and Gynæcological Society.

(iii) The Medical Association, Bombay North.

7. *Control of Patent Medicines and Proprietary Drugs*: This Conference is of opinion that to control the patent medicines and proprietary drugs from foreign countries and those manufactured locally, an official Standing Committee be created to investigate these preparations and license their sale and import.

8. *Licenses for Intoxicating Drugs:* This Conference earnestly draws the attention of the Government to the present terms of licenses for dangerous drugs, *viz.*, Cocaine, Opium and Morphia, as causing much inconvenience and hardship to the licensees amongst the medical profession in the matter of keeping day to day accounts, transit of drugs from Chemists to the licensee, renewal of licenses every year and payment of license fee separately for the three drugs; and requests the Government to issue one single free license as before, to waive the condition of transit permit in the case of local purchase to the extent of one drachm of Cocaine, one Lb., of liquid derivatives of Morphia and Opium or their equivalents in solid form, and to hold one annual inspection only.

9. *Disallowance of Private Practice of Whole Time Medical Men Attached to Hospitals, Medical Schools and Colleges*: This Conference recommends to the Government of Bombay that the whole time medical men attached to the Civil Hospitals, as also professors and lecturers in the Medical Schools and Colleges,—except the Honorary staff—should be debarred from private practice.

10. *Legal Recognition only to Practitioners having Registrable Qualification in Western Medicine*: This Conference recommends to the Government of Bombay that no legal recognition should be given to practitioners who do not hold a registrable medical qualification and who practise the indigenous systems of medicine prevailing in this country, until the merits of the systems be proved by investigation to be at least equal to Western System of Medicine as it is understood to-day.

11. *Designation of 'Doctor' only to those who Hold Registrable Medical Qualification in the Western*

*Science of Medicine*: This Conference recommends that only a person practising in the Western Science of Medicine shall be allowed by law to designate himself or herself as 'doctor,' provided he or she holds a registrable medical qualification in the Western Science of Medicine (as at present understood.)

12. *Abolition of Licentiate Course*: Owing to the difficulties that have arisen so far, in the way of keeping a common Medical Register for the graduates and the licentiates in Medicine and Surgery, and as the medical course of the licentiates has been almost raised to the standard of the medical graduates, this Conference resolves that the Licentiate Course be entirely abolished.

13. *Common Medical Register*: This Conference earnestly requests that there should be one common Medical Register maintained according to alphabetical order of names irrespective of degrees or diplomas held by the individuals.

14. *Changes in the Bombay Medical Act*: This Conference recommends that the Government of Bombay be requested to amend the Bombay Medical Act (as amended by Bombay Acts No. IX of 1912, Nos. III and IV of 1916 and No. IV of 1918) as under:—

(A) Section (2) "Substitute the word 'fourteen' in place of 'thirteen'.

Section (2A) "Substitute the following:—

'A President to be elected annually by the Council from amongst its own members.' "

Section (2b) "Substitute the word 'four' in place of 'six'."

Section (2c) "Substitute the word 'five' in place of 'four'."

Section (2d) "Substitute the word 'five' in place of ' two.' "

And that, there should be ten representatives elected by a common electorate of licentiates and graduates, and elected members should consist of five graduates and five licentiates, two of each group (licentiates and graduates) should, however, be from the mofussil.

(B) Section (5) Omit the word 'previous' in both the sub-sections.

The original section in the *Medical Register* runs—

Any order of the Medical Council appointing, granting leave to, or dismissing a registrar shall be subject to previous approval of the Governor-in-Council.

The Medical Council with the previous approval of the Governor-in-Council may appoint such other officers or clerks as may be necessary for the purposes of this Act.

15. *Countersignatures on Certificates by Registered Practitioner*: This Conference resolves that the Government be requested to issue instructions to all its Departments to accept all certificates——except those for entrance into Government Services——granted by Registered Medical Practitioners, and that the present practice of countersignatures be discontinued.

16. *Pathological and Bacteriological Reports from Government Hospitals*: This Conference requests Government to issue instructions to the Heads of Government Civil, Military or/and Municipal Hospitals to the effect that a requisition from a Registered Medical Practitioner for an X-ray report or a Clinical Pathological or Bacteriological report on his private patient should be complied with on payment of the corresponding scheduled fees.

17. *Facilities of Clinical Laboratories in the Mofussil*: This Conference recommends that a small clinical laboratory, including a microscope and common stains required in daily practice, should be supplied to all the Government Dispensaries in the mofussil and reports on pathological material from patients of private medical practitioners should be given at scheduled charges.

18. *Sanitary Boards for Municipalities*: This Conference recommends that in every Municipal town there should be a separate Sanitary Board consisting of registered medical practitioners and other representatives of the town, to make recommendations on the sanitation and health of the town, and the Minister of Local Self-Government be requested to consider this point while amending the Act.

19. *Tuberculosis and Venereal Clinics in Towns:* In view of the far-reaching harmful effects following upon Tuberculosis and Venereal Diseases,

this Conference recommends to the Government that suitable steps should immediately be taken by them to establish separate clinics for these diseases in towns with a population of 50,000 and over.

20. *Tuberculosis a Notifiable Disease*: This Conference recommends to the Government to make Tuberculosis a notifiable disease in the Municipal areas of the Bombay Province.

21. *Payment of Fees for Insurance Examinations*: This Conference is strongly of opinion that the Insurance Companies should make no difference in the payment of fees for examining a life of a particular policy value, whether examined by a licentiate or a graduate, and that the minimum fee should not be less than Rs. 10/-.

22. *Post-Graduate Refresher Course*: This Conference is emphatically of opinion that there is a great necessity of keeping up the efficiency of the general practitioner and requests the Medical Teaching Institutions at Bombay, Poona and Ahmedabad, to start Refresher Courses for the general practitioner as early as possible.

23. *License for Spirituous Preparations*: This Conference regrets to note the action of H. E. H. the Nizam's Government in imposing licenses for spirituous preparations, on medical practitioners, and strongly recommends the removal of the same as early as possible.

24. *Provincial Branch of the Indian Medical Association*: This Conference resolves that a Provincial Branch of the Indian Medical Association, for the Maharashtra and Karnatak should be organised, and branches established in all the districts of the provinces: the Central Office of the Provincial branch should be established in Poona, and a Committee be appointed to implement this resolution and others passed at this Conference:—

*President*—Dr. K. S. Mhaskar.

*Members*—Dr. L. D. Dhawale, Dr. B. G. Vad, Dr. Khan Bahadur E. S. Bharucha, Dr. N. L. Ranade.

*Secretaries*—Dr. R. N. Apte, Dr. G. G. Tembe.

25. *Committee to Investigate the Economic Conditions of Practice*: Resolved that a Committee be appointed to investigate the economic conditions of Medical Practice in this Province, particularly with regard to fees, dispensary practice, overcrowding, relations with consultants, etc. The Committee shall consist of the President and Secretaries of the Conference, Dr. L. D. Dhawale and Dr. B. G. Vad, the Presidents of the local Institutions who are willing to co-operate and such other persons as the President may co-opt.

The Standing Committee shall publish its findings and recommendations within six months.

26. *Insurance Benefit Schemes for Practitioners*: This Conference is of opinion that in order to give more stability to the medical practitioner, it is necessary to have such scheme as—

(i) Doctors' Sick Insurance.

(ii) Mutual Benefit Scheme.

and recommends that the Standing Committee should frame such schemes early and circulate them for opinion among the District Medical Associations.

27. *Authority to President to Forward Resolutions, etc*: This Conference unanimously authorises the President to send the Resolutions passed in its sessions, to the proper authorities and institutions.

Resolutions moved by Dr. Dhawale of Bombay, in the Kolhapur Conference which failed by majority.

(1) This Conference recommends that only a person practicing Western Science of Medicine or any other Western art of healing shall be allowed by law to designate himself as a doctor, provided he holds a registrable medical qualification in the Western Science of Medicine.

(The amendment to this resolution was put as a substantive proposition on being passed by the Conference and on being passed again, became Resolution No. 11).

(2) This Conference recommends that the Science of Homeopathy which originated in Germany and is established on the fundamental laws of Western Science of Medicine.

(3) This Conference recommends to the Government of Bombay that a Homeopathic Medical Council and Corporation should be established in the Province of Bombay with a view to encourage the post-graduate study and practice of the Homeopathic branch of the Western Science of Medicine.

# MEDICAL NOTES AND NEWS

## ZOOLOGICAL SURVEY ON WATER PURIFICATION

Investigations by the Zoological Survey of the Government of India have solved a problem which was threatening to dislocate Calcutta's water supply.

The investigations were undertaken with the object of improving the conditions of filtration in the sand filter beds of the waterworks, the clogging of which involves a loss of about Rs. 100 per day per filter-bed.

A very large number of living organisms and plants were found in the beds. It was discovered that the filter-beds were blocked by the secretions of the grub of a fly which infests the neighbourhood. These grubs in turn secrete a sticky substance with which they cement together sand particles into tubes or mounds.

The simple remedy was to clear the grass and vegetation near the beds, for this attracted the flies which were responsible for the grubs. This suggestion has been adopted by the authorities with good effect.

A comprehensive examination of the filter-beds, settling tanks, cisterns, etc., was made at the same time, a great deal of valuable information about different plants and insects being obtained regarding questions of water purification in India on a large scale.

## DELHI CAMPAIGN AGAINST MALARIA MOSQUITOES

Remarkable results have been obtained as a result of the work of the Anti-malaria Staff in Delhi.

Rainfall being below normal, mosquito breeding places are reported to have been easily controlled by temporary measures. The staff has been engaged upon the weeding and edging of excavations and the removal of grass from certain areas, exposing depressions which could then be promptly treated when necessary. A low-lying tract has been raised sufficiently to counteract swamp-formation even when the river rises to a level higher than that observed in the preceding season.

Collections of adult mosquitoes throughout the Delhi Urban Area indicated a remarkably low prevalence of malaria-carrying mosquitoes.

A spleen census of school children taken in a group of schools, approximately on the same dates as last year, has shown a continued decline in the spleen rate.

The use of insecticidal sprays for the control of malaria in certain isolated communities was continued and careful records are being maintained of the effects of these measures on the incidence of malaria.

A camp accommodating approximately 3,000 coolies has been established near the Purana Quila. Special attention was given to this area. Mosquito breeding centres round the camp are being systematically controlled and prompt and efficient treatment is being made available for malaria cases.

## BENJAMIN AND RAMACHANDRIAR PRIZES

The General Secretary, A. I. M. L. Association, Bombay 4, notifies that the subject for Dr. Joseph Benjamin Prize of the value of Rs. 35/- for the year 1937, is *Puerperal Sepsis*, its cause, symptoms, treatment and prevention; and for the Dr. P. S. Ramachandriar prize of the value of Rs. 25, for the year 1937, is *Cholera*, its prevention, causes, symptoms and treatment.

All bonafide members of the Association can compete. Intending competitors are required to write papers from practical point and on lecture style and the same should not exceed 1000 typed lines or their equivalent.

The papers should be sent to Dr. Jamitram B. Desai, President, Gujrat Branch, All India Medical Licentiates' Association, 52. Pritamnagar, Ellis-Bridge, Ahmedabad so as to reach him on or before the 31st March, 1938.

## THE NOBEL PRIZE FOR CHEMISTRY

A few people who ought to know better still say that they "don't believe in vitamins," but they must find it hard to assimilate this point of view with the recent award of the Nobel prize to three workers on

vitamins. Hard on the heels of the award in medicine to Prof. Szent-Gyorgyie for his work on vitamin C comes the announcement of an award in chemistry divided between Prof. P. Karrer of Zurich and Prof. W. N. Haworth, F.R.S., of Birmingham. Both these workers have to their credit, among their most recent contributions, important discoveries in the chemistry of the vitamins.

The award to Prof. Karrer was made for his work on the carotenoids and on vitamin $B_2$. The carotenoids are the fat-soluble yellow pigments which are found in plants, of which the carotene of the carrot is the most familiar. Prof. Karrer has sorted these out into hydrocarbons and the acids and alcohols derived from them, and has worked out their structural relation to one another and to the colourless vitamin A. A big blank in knowledge has been filled in with one of the most æsthetically satisfying pictures in chemistry, and Prof. Karrer is the chief artist. With regard to vitamin $B_2$ his work has been on the flavin component of the vitamin $B_2$ complex. Flavin again is a yellow pigment but a water-soluble one, occurring for instance in egg-white, liver, and milk, and for its synthesis Karrer and the German chemist, Kuhn, working separately, are together responsible.

Prof. Hawroth, who shares the prize with Prof. Karrer, has worked for many years on the chemistry of the carbohydrates, and particularly on their structural formulæ, the establishment of that for the biose sugar maltose being a notable achievement. His great experience in this field placed him in a particularly favourable position for solving the structural formula of vitamin C, ascorbic acid. For some time a number of rival solutions were in the field, but the formula worked out by Haworth and his colleague, E. L. Hirst, is that which is now generally accepted. In this last piece of distinguished work the discoveries of Hawroth and Hirst are complementary to those of Szent-Cyorgyl rather than of Karrer, though Karrer did also make some contribution to confirming the correct formula for ascorbic acid. (*Lancet*, November 20, 1937, page 1205-6).

## THE MEDICAL USES OF RADIUM

The activities during 1936 in the experimental laboratories and the clinical research centres cooperating in the special investigation of the effects of radiation are summarised in a green book issued by the Medical Research Council. The subject of radiosensitiveness is receiving much attention; this is, of course, of the utmost importance to the clinician who has to consider suitable treatments for tumours which may vary widely in their response. The work of Mr. F. G. Spear, D.Sc., and Dr. A. Glucksmann at the Strangeways Research Laboratory has shown that it is possible to discriminate between the effects of radiation, of chilling and of fasting on mitotic division in tadpoles, and that radiation in the doses used is only effective in producing degeneration when mitosis is either active or approaching a state of activity. The occurrence of degenerate cells has also been studied quantitatively in this laboratory, and the results support the theory that the effect of gamma rays on cells about to divide makes them unfitted for the ordeal of mitosis. Mr. D. E. Lea, PH.D., in collaboration with the Low Temperature Research Station, has investigated the action of gamma rays on bacteria and concludes that large doses of radiation have in addition to their lethal action in the property of inhibiting division without hindering the increase of volume of the individual organism. He has also demonstrated an interesting difference in the reaction of certain organisms to beta radiation though their reaction to gamma radiation is very similar. Dr. J. C. Mottram of the Mount Vernon Hospital and the Radium institute has attempted to relate radioresistance to anærobiosis. Basing his argument on observation of the effect of radiation on the deep lying cells of tar cancers in mice, he suggests that the better the blood supply the more sensitive the cells. He believes that periods of rapid growth, which can be found by measuring the tumour are associated with an increased blood-supply and that radiation during these periods is more effective. Certain cases of advanced but slowly evolving cancer in the human subject have been treated by radiation given only during the times of growth, 500 being given each time radiation is applied, and it is said that a number of tumours have been made to disappear locally. The influence of abundant mitotic division has also been studied and it seems that there must be some difficulty in distinguishing between the two effects with tumours treated *in vivo*. The statement that tumours composed of small cell masses should be more sensitive than those with large cell masses is open to

question, since certain large encephaloid tumours of the breast, for instance, are very radiosensitive.

Further proof of the difference in sensitivity of the actively functioning and relatively quiescent tissues is given by the experiments of Dr. H. A. Colwell and Dr. G. P. Gladstone at the Barnato Joel Laboratories of the Middlesex Hospital. They irradiated pregnant rats at full term and killed the animals 24 hours later. Histological examination of the alimentary canal of mother and fœtus showed pronounced changes in the adult tissues, but practically no deviation from the normal in the section of the irradiated fœtus. Further interesting reports come from Prof. Sidney Russ and Miss C. M. Scott at the same laboratory, from Dr. M. A. C. Cowell of the Holt Radium Institute, and from Joan Ross of the Royal Free Hospital. At the physics department of the Imperial College of Science and Technology experiments on artificial radio-activity, the biological action of neutrons and the effects of low temperature on absorption of neutrons suggest interesting possibilities, and much careful work by Mr. W. V. Mayneord, M.SC., at the Royal Cancer Hospital finally concludes that the e. mg. h. unit is equal to 8·3 rœntgens. The section on therapy follows the usual lines and no special innovations call for comment. The number of cases of cancer of the breast treated by radium implanation shows a slight decrease, suggesting that it has not replaced surgery for the early case, while some centres now prefer X-ray therapy for the advanced case. The results in cancer of the cervix show a slight but steady improvement, and the very low mortality rate in the year 1936 is particularly hopeful; it looks as if the immediate dangers of treatment are being overcome. Birmingham draws attention to the danger of necrosis in the treatment of cancer in the mouth, and to the difficulty of distinguishing necrosis from recurrence. For the cases quoted the dose stated is 8000 r in 164 and in 198 hours; this dose is higher than that delivered in most centres. Finally there is a short report on the one-gramme teleradium units. The two and four-gramme units which are being installed at University College Hospital and at the Middlesex Hospital are not yet available for treatment. (*Lancet*, Nov. 13, 1937, pages 1151-52).

## CORRESPONDENCE

*The Editor is not responsible for any views expressed by the contributor*—ED.

To

The Editor,

*Journal of the Indian Medical Association.*

Dear Sir,

A printed circular issued under the signatures of Dr. Ram Narain Lal, Dr. S. L. Sharma, Dr. K. B. L. Varma and Dr. Bhandari (all from U. P.) was circulated all over U. P. and other provinces making certain allegations against the I. M. A.

A reply to the same has been issued by the Hony. Provincial Secretary of the I. M. A., U. P. Provincial Branch, refuting the charges, which were baseless.

A copy of the above-mentioned Circular Letter has been published in the *Indian Medical Journal* last month.

I would therefore request you to publish the copy of the Provincial Secretary, I. M. A., U. P. Provincial Branch's reply in your esteemed Journal.

Yours Truly,

R. N. BOSE, Capt., M.B.,

*Hony. Provincial Joint Secretary.*

U. P. PROVINCIAL BRANCH, I. M. A.

Meerut, November 12, 1937.

My dear Dr.,

It has been brought to my notice that a pamphlet said to be "U. P. Standing Committee of Licentiates' mandate to medical Licentiates to boycott the Indian Medical Association" has been broadcast to all the Licentiates in U. P. and other Provinces and has caused great uneasiness in the minds of some of our Licentiate friends. As the pamphlet is full of mis-statements and is, evidently, designed to excite class feeling among the Licentiates, I feel it is very necessary that true facts should be placed before you so that you may be able to judge for yourself and come to a correct decision in the matter.

(A) In para. 1 of the mandate statements like the following are made:—

(a) "The I. M. A. . . . . has assumed a reactionary and hostile behaviour towards the interests of the Licentiates."

(b) "They could not imagine that the I. M. A. would so soon become the mouthpiece of vested interests of Graduates—that lip sympathy and Shylock like behavior towards Licentiates would be openly practised and members, who would venture to ventilate the grievances of the Licentiates, would be ill-treated and victimised."

Now these statements are so wild and baseless that one wonders how any responsible person could dare make them! The

real facts, as I give you below, will prove beyond a shadow of doubt that the attitude of the I. M. A. towards the Licentiates has, persistently, been one of fullest sympathy with their aspirations and anxiety to raise their status:—

(a) Resolution No. 11 of the All-India Medical Conference held at Lucknow in 1932 which asked the Government to raise the standard of the medical schools so as to approximate it to that of medical colleges and to provide facilities to the Licentiates, after further training, to appear at the University examination.

(b) Resolution No. 2 of the All-India Medical Conference held at Delhi in 1934 which condemned the Indian Medical Council Act and demanded inclusion of the Licentiates within its purview.

(c) Resolution No. 2 of the All-India Medical Conference held at Nagpur in 1935 which demanded that the standard of education imparted in all medical institutions should conform to the minimum laid down by the Indian Medical Council.

(d) Resolution No. 2 of the All-India Medical Conference held at Karachi in 1936 which, agreeing with the principle that the Indian Medical Council Act required amendment, appointed a Sub-Committee for the purpose. The Sub-Committee, I am informed, is ready with its recommendations.

(e) Recommendations of the Central Council of the I. M. A. regarding the proposed Indian Medical Council Act:—

(i) " The Licentiates should be brought within the purview of the Bill and given adequate representation;"

(ii) " The Licentiates, in each Province, should be allowed one representative each in the Indian Medical Council."

(f) A Deputation organised by the I. M. A. waited on the Hon'ble Minister, Government of India. The following are some of the cogent extracts from the Memorandum submitted by the Deputation:—

(i) Objecting to the qualification " higher," it said " thereby the largest section of the Indian medical profession about 30,000 in number is excluded."

(ii) " We have to study the interests of the overwhelming number of practitioners in India (meaning the Licentiates) before the interests of a few scores who proceed abroad for study."

(iii) " If it is thought that to bring the Licentiates within the scope of the Bill would jeopardise the chances of recognition of the Indian Medical Degrees by the General Medical Council (of Great Britain), we submit that the interests of these 30,000 medical practitioners are more important than the regaining of recognition by the British institutions."

(iv) " We do not see that the inclusion of the Licentiates would, in any way, defeat the objects or purpose of the Bill; in fact their exclusion would be a fact highly to be depreciated."

(v) " One of the main reasons why we object to the exclusion of the Licentiates is that it makes an invidious distinction in the ranks of the medical profession in India."

(g) Resolutions passed at the 2nd, 3rd and 4th U. P. Medical Conferences demanding the raising of the standard of education in the medical schools with a view to the recognition of the Licentiate qualifications by the Indian Medical Council.

The solid facts given above speak for themselves. Considering all that the I. M. A. has been doing for the cause of the Licentiates, the charge of " reactionary and hostile attitude towards the interests of the Licentiates " is simply baseless and to call it lip sympathy and Shylock like behavior is most unjustifiable. Evidently the cry of Licentiate interests in danger is set up to catch the imagination of the Licentiates and poison their minds against the I. M. A.

In the same para it is said that " the members who would venture to ventilate the grievances of Licentiates would be ill-treated and victimised." It is not at all clear what the signatories refer to. The I. M. A. has not ill-treated or victimised any Licentiate brother.

(B) In para. 2 of the pamphlet the signatories have referred to the following matters and have wrongly blamed the I. M. A. for them:—

(a) The Indian Medical Council Act. It is affirmed that:—

(i) " The big guns of the I. M. A. publicly declared that they would not look at the Indian Medical Council if the Licentiates were not included."

(ii) " No sooner the defective Bill was passed the very same people constituted the Council and are running the show."

(iii) " They have done nothing to fulfil the pledge which shows that the original move was an " ingenious design to win over the Licentiates, etc."

That the I. M. A. tried hard to get the Indian Medical Council modified so that the Licentiates may be brought within its purview is a fact which cannot be controverted by anybody, and that the efforts of the I. M. A. were not wholly unsuccessful is also a fact as, it was, as a result of the agitation carried on by it, that the exclusive register for Graduates was given up by the Government and the Indian Medical Council is going on without a register of its own.

When, however, the Medical Council Bill became an Act, those who honestly believed that they could do more useful service to the profession by entering the Council, however defective it may be, than by remaining out of it joined the Council. Opinion may differ as to whether people should have joined this Council or not, but to attribute motives to those who entered it and to call it an " ingenious device to win over the Licentiates etc." is most uncharitable.

The I. M. A. has been doing its best to get the Act amended. In the Karachi Conference a resolution on the subject was passed and a Committee appointed which has formulated its proposals. Protest meetings have been held against the Indian Medical Council by branches of the I. M. A. all over India from year to year. The attempt to belittle all that the I. M. A. has done in this connection cannot be taken seriously by anybody who knows facts.

It is further affirmed that at the Nagpur All-India Conference the Graduates raised technical objection to Dr. W. B. Narayan Rao's resolution about amendment of the Indian Medical Council Act. This refers very likely to the discussion on the resolution in the Subjects Committee and it is really too much to expect that all members should simply ditto every resolution put forward. The Subjects Committee is a place where frank and free discussion on every resolution is necessary so that all points of view may be considered. If some members of the Subjects Committee raised technical objections, as affirmed, it cannot be inferred that the I. M. A. was opposed to the resolution. The mover himself withdrew it on the advice of his friends as it was

considered by them more desirable to have it moved by members of the Legislative Assembly, although if the resolution was pressed by the mover, it had a very good chance of being passed as the majority of the members was not opposed to it. To make use of this as an argument to urge the Licentiates to boycott the I. M. A. is most unfair.

(b) Joint Elections in the U. P. Medical Council. It is said that " when the resolution for joint electorates composed of Licentiates and Graduates was moved in the U. P. Medical Council, it was voted down through the influence and vote of the President of the I. M. A. This is enough to show which side the wind is blowing."

The policy of the U. P. Provincial Branch of the I. M. A. on the question of joint electorates is still the same, i.e. it favours joint electorates as is clear from the resolution about amendments to the U. P. Medical Act which has been passed at the Benares Conference. To say that the President of the I. M. A. voted it down is wrong as no President of the I. M. A. was a member of the U. P. Medical Council when the question came up for discussion. Besides individual members may have their own individual opinions. However it is a fact, which must be known to the signatories themselves, that some Graduate members of the Council who are members of the I. M. A. voted for the resolution.

(c) The Question of Hony. Physicians and Surgeons. It is being considered by the U. P. Provincial Branch of the I. M. A. It finds the rules extremely defective for the Licentiates and the Graduates alike and is trying to propose changes and a Deputation is going to wait on the Hon'ble Minister of Health in this connection.

As regards the examination of policy holders of Life Insurance Companies—the question is one between the company and the doctor. The I. M. A. cannot force them in this matter. Even Graduates as such cannot claim to be company's doctors. The companies have a right to pick and choose according to their requirements. I know that some of the Licentiates are working as Insurance doctors so that there is no ban on the class as such. To blame the I. M. A. in this connection is sheer propaganda.

(C) In para. 8 reference is made to some of the service grievances of the Licentiates that were brought to the notice of the U. P. Provincial Branch of the I. M. A. through the offensive circular letter of Dr. Ram Narain Lal. A few extracts from this ill-conceived letter may be of interest :—

(i) " The P. M. S. Association is doing great harm to members of L. M. P. Association in service."

(ii) " It represented that the Mussoorie Dispensary should be taken away from the Licentiate and put in charge of a Graduate."

(iii) " It represented to the Government that promoted P. M. S. (from amongst the Licentiates) should not get chances of Civil Surgeoncy."

(iv) " It has now represented that even an officiating chance in short vacancy of Civil Surgeons should not be given to promoted P. M. S."

(v) " If the I. M. A. does not counter-effect the above. . . . . by writing to the Government that it does not subscribe to the policy enunciated by the P. M. S. Association . . . . . it will be high time to consider whether the Licentiates should continue to remain members of the I. M. A."

(vi) " If no action is taken by the U. P. Provincial Branch of I. M. A. to safeguard the interests of the Licentiates I have decided to strongly advise the forthcoming Conference of our Association . . . . to order the withdrawal of all our members from the different branches of the I. M. A."

Now these quotations definitely show that grievances of the Licentiates against the P. M. S. Association were asked to be taken up by the U. P. Provincial Branch of the I. M. A. at the point of the pistol in the shape of threat of wholesale Licentiate withdrawal from the I. M. A. Dr. Ram Narain Lal was a member of the I. M. A. and a member of the Provincial Council and could have easily brought this matter up before the Provincial Council, but he adopted a queer way of issuing a circular letter to the Licentiate branches though worded as an ultimatum for the I. M. A. Why Dr. Ram Narain Lal adopted this tortuous procedure I leave you to judge. On the basis of this letter the I. M. A. was asked to condemn the P. M. S. Association. The P. M. S. Association might come forward and ask the I. M. A. to condemn the Licentiate Association for certain posts taken away by the Licentiates from the Graduates. That a grievance of this sort is nursed by the Graduates in service has been brought to my notice. To save the I. M. A. from getting entangled in this vicious circle the I. M. A. has come to a definite decision that at this stage of its development it should keep itself aloof from the service controversies of the Graduates and the Licentiates, who have associations of their own to look after their service interests, if it is to usefully serve as a common platform for both. The I. M. A., however, is committed to raising the educational standard of the Licentiates and getting them recognition by the Indian Medical Council which are the basic needs of the Licentiates and will *ipso facto* take away the ban of inferiority which hangs over them. This it has been doing in spite of the most unreasonable attitude of some of the Licentiate leaders of U. P.

(D) In para. 4 the statement read at the time of the walk-out at Allahabad is given in which the grievances referred to in Dr. Ram Narain Lal's circular letter are mentioned and the charge of monopolising offices by Graduates is levelled.

The grievances have been dealt with by me in para. (C) above.

As regards the charge of monopolising offices by the Graduates—the selection of office-bearers takes place by election and it is the electorate which decides whom it considers best suited for a particular office. The I. M. A. has laid down a definite policy as regards offices—the right man in the right place irrespective of class—and this is the only desirable policy. It was in pursuance of this policy that the Hon'ble Dr. Rama Rao—a prominent Licentiate of Madras—was elected as President of the I. M. A.—the highest honour in the power of the electorate. Once the question begins to be looked at from class point of view the real charm of brotherhood, which the I. M. A. has been striving hard to develop in the medical profession, will disappear.

(E) In para. 5 it is suggested that " the I. M. A. should have tried to ease the situation." The situation being the creation of some interested individuals who had failed to secure cer-

tain offices in the open election at the Annual meeting of the I. M. A. at Allahabad and had taken up a wholly unreasonable attitude of opposition for the sake of opposition, how could the I. M. A. help to ease it? It certainly cannot yield on principles to satisfy these gentlemen whose activities during the whole of last year have been directed against the I. M. A.

It is further affirmed that the Provincial Secretary of I. M. A. rushed to the lay Press with a distorted and garbled account and that Dr. Kunj Behari Lal sent a short note to disclose true facts. This is such a deliberate mis-statement that it is sheer audacity on the part of the signatories to put it down in black and white. This was also part of a resolution of the Standing Committee of Licentiates [Resolution 4 (b) of Standing Committee meeting held on 20th March, 1937] and was challenged by the Provincial Secretary of the I. M. A. as far back as June, 1937. Nobody has dared to accept the challenge and the wrong statement is being repeated! Provincial Secretary of I. M. A.'s first communication in the lay Press is dated 8th November, 1936, and was published in the *Hindusthan Times* of 11th November, 1936. Dr. Kunj Behari Lal's communication is dated 4th November, 1936 and was published in the *Leader* of 7th November, 1936. How could a communication published on 7th November, 1936 be a reply to the communication published on 11th November, 1936 passes my imagination!

Another deliberate mis-statement is about resignation of Licentiates from the I. M. A. in obedience to the mandate of the U. P. Standing Committee:—

(i) It is said that " to begin with 25 Licentiates of Meerut resigned " but the information that all of them except 2 withdrew their resignations as soon as the misrepresentations were exposed is conveniently suppressed.

(ii) " Subsequently Licentiates of Lucknow, Aligarh, Saharanpur, Mussoorie, Bareilly and Moradabad also severed their connection." The long list of districts is meant to impress that resignations were general all over the Province which is quite wrong. The facts are:—

(i) Two Licentiates of Meerut resigned on the Allahabad walk-out issue in November, 1936.

(ii) Three Licentiates of Mussoorie resigned on this issue about the end of June, 1937, Dr. Ram Narain Lal being one of them.

(iii) No other resignations on this issue were received by the Provincial Office upto 30th September, 1937—the close of the year.

(iv) Even some of the members of the Standing Committee, who were responsible for the mandate, did not resign and continued as members—Dr. Ram Narain Lal upto June, 1937 and Dr. I. N. Saxena upto 30th September, 1937—though the mandate was passed on 30th October, 1936 at Allahabad.

I cannot help but congratulate the Licentiates on keeping their head cool in spite of persistent propaganda to mislead them carried on since the Allahabad Conference.

(F) In para. 6 reference is made to Deoria and Saharanpur Branches' request for an enquiry into Allahabad walk-out affairs. These requests were based on a perusal of the misleading communication of Dr. Kunj Behari Lal Varma published in the *Leader* of 7th November, 1936. The U. P. Working Committee of the I. M. A. went into the whole question in detail and came to the conclusion that there was no *prima facie* case for an enquiry. The Central Council has fully endorsed the findings of the Working Committee. Surely no responsible body would order an enquiry on the basis of such irresponsible statements as were contained in Dr. Kunj Behari Lal Varma's communication in the *Leader* of 7th November, 1936.

(G) It is on such misrepresentations as I have tried to expose above that the signatories want you to sever your connection from the I. M. A. I would only appeal to you to look at the question dispassionately and not be led away by misrepresentations indulged in by interested people and I have no doubt you will come to the only conclusion that there is no occasion for severing your connection from the I. M. A.—that the interests of the Licentiates and the Graduates are closely interwoven and the step advocated by the signatories is bound to result in incalculable injury to the profession as a whole—not only the Graduates but the Licentiates themselves. If you have any doubt still and want any information to clear any point, I shall be only too glad to supply you with it.

With kind regards.

Yours Sincerely,
BHUPAL SINGH, B.A., M.B.
Hony. Secretary, U. P. Branch.

# ACKNOWLEDGMENT

RECEIVED FOR REVIEW

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